MAR 25 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 6, 1898. CHICAGO, ILL. NUMBER 1

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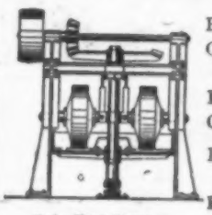

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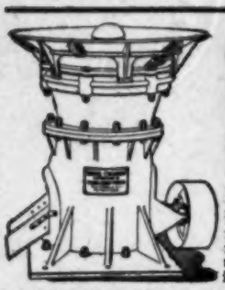

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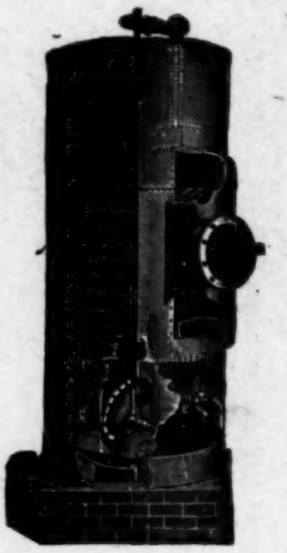

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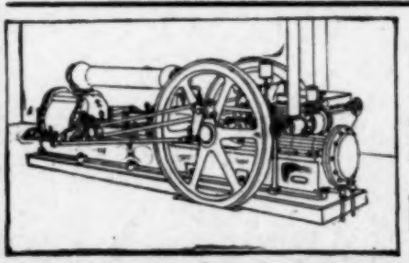

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 6. 1898. CHICAGO, ILL. NUMBER 1

THE WEEK IN IRON CIRCLES.

The iron trade has seen more activity in the past week than usually attends the crossing into a new year. Not that any notably large contracts have been closed; but in all lines, pending inquiry and negotiation represent a larger volume of business than would be expected so early in January. Confidence is everywhere in evidence and calculations for 1898 are on a liberal scale. There is less of the hesitancy and uncertainty about the probable course of prices than is to be observed ordinarily at the opening of a year. Buyers are more willing, apparently, to make long contracts than are sellers. In pig iron, prices for the time are favorable to buyers, some of the lowest quotations since August having been made on foundry irons in the past fortnight. Southern and Northern furnaces alike are making these concessions, and they have been most marked in the East. In Chicago and Central Western territory, Southern sellers have taken the initiative in lower offers, bringing their prices closer to the Northern level. Gray forge iron in valley districts has been firmer, the output being so comparatively limited that any moderate buying movement causes a quick response in prices. Mahoning valley deliveries are now on a $9 basis, with $9 to $9.15 quoted, Pittsburg. Bessemer pig iron is quiet. January iron is quoted $9.50 by furnaces, with $9.65 asked for the first quarter. Billets and sheet bars have shown considerable activity, sales of the former having been made at $15 and a shade lower, maker's mill, and of the latter at $17 to $17.25. Railroads continue to add to the rail tonnage booked for 1898, and in the Chicago district alone 150,000 tons are reported closed in the last 10 days of 1897. Pittsburg has done a large business also, and the Eastern mills have made a good start, though they are quite behind Pittsburg and Chicago. As indicated in this column one week ago the beam mills have come together on prices again, the two Pittsburg, the Johnstown and three Eastern mills being parties to the agreement. Delivered prices are made—1.30c in the East, 1.25c in middle Pennsylvania, 1.15c Pittsburg territory, 1.25c Ohio. Where the freight from Pittsburg is less than 10c, the delivered price will be 1.15c plus freight. Tonnage allotments are made with a pool tax on over-shipments. It is not expected that the advance will stop at $1, but it will be conservative. Pipe and tube manufacturers had a meeting in Philadelphia last week, with the largest representation of mills yet secured. The outlook was reported excellent and agreed prices generally maintained. A third meeting was that of tin plate manufacturers at Columbus, to consider the request of jobbers for a 2 per cent cash discount, and to act on the proposed change in the base box system. No action was taken to correct the present price demoralization, and after the fruitless effort of last year, the attempt will not be seriously renewed. The wire consolidation appraisers have been at work in Cleveland the past week. Representatives of a Western Pennsylvania plant, entirely modern, are quoted as willing to sell out but unwilling to enter the consolidation.

THE CLEVELAND DISTRICT.

The preliminary negotiations looking to the continuance in 1898 of the organization of Bessemer ore producers are on the assumption that the pool for this year will include the Mesabi range. If it should appear that producers on the new range cannot agree on a tonnage basis, it is probable that the question will then come up, as it did last year, whether the old range companies will organize by themselves. So far as the situation is affected by the mining operations of the leading consuming interest, the old ranges and the Mesabi are now on a par, while last year the Oliver Mining Co. had entered on the Mesabi range only. Appearances thus far are that Mesabi producers will welcome an agreement. Tonnage questions will not be the obstacle they proved last year; and so far as anything is said concerning price, it is intimated that 25 cents advance meets the idea of many producers. The latest exploit of the sensation mongers in industrial news, is the Pittsburg telegram that went to the ends of the country, announcing a 4,000,000-ton sale of Mesabi ore by Warner, Stuart & Co., Cleveland, for delivery in Cardiff, Wales. There is no truth in the story, as could have been ascertained readily on inquiry; yet no correction of the absurd canard has appeared in any of the papers that displayed it so glaringly. James W. Miller, of Pittsburg, who was credited with the big sale, has had some correspondence with Warner, Stuart & Co. as to the cost of freighting Lake Superior ores to England and Wales; that is all.

Pig Iron. With January requirements of steel works covered in large part, no heavy demand for Bessemer pig iron is looked for immediately, particularly in view of the accumulation of Bessemer iron by steel makers in the holiday shut-downs. Valley furnaces are holding quite firmly at $9.50 for early delivery, however, and $9.65 is asked on deliveries over the next four months. Some sellers of foundry iron are going below $9.50 at furnace for No. 2 and for the moment buyers can make good terms, though producers are not willing to make long engagements or to sell largely at the concessions. Inquiry is of good proportions and there is a prospect of considerable business just ahead. Gray forge in the valley is firmer and recent buying brought the delivery price, valley mill, up to $9. We quote Cleveland delivery:

Bessemer	10 15	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 50@10 75	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 00@10 25	Gray Forge	9 25
No. 3 Foundry	9 25	Lake Superior Charcoal	12 00

Finished Material. A 2,000-ton ton contract for Rock Island bridge work comes to Cleveland and the material has been bought the past week. An additional 1,000 tons for the same road is to be let later. Some local building work for the coming spring is being figured on and one 1,000-ton contract for steel has been closed in this connection. Beams, under the pool agreement, are now 1.23½c delivered in Cleveland, with the probabilities that another $1 a ton will be added at the next meeting. A Northern Ohio agricultural works is in the market for a year's supply of plates, bars, machinery steel, etc. In pipes and tubes a good business is going, one charcoal tube contract in the week amounting to 700 tons. Agreed discounts are quite well maintained. Bars are quiet, and on iron .95c valley is still quoted. The appraisers for the wire combination have been at work on local plants this week. It is not decided yet whether the incorporation will be in New Jersey or in Illinois. Indications are that more cash will be required for purchases than had been counted on by the promoters of the big deal. Wire is quoted at $1.20 Cleveland, and wire nails at $1.40, in carload lots.

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CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Jan. 5.

The year opened quietly, with no very great activity in any branch of the market. The general feeling among iron and steel dealers is one of great confidence in the future, and it is believed that the coming year will be without doubt one of prosperity to the mills and furnaces, and every one connected with the trade. It is thought, by the best posted men, that prices will not be much higher in the year than they are at present, althougth some advance is expected. Yet values are expected to rule sufficiently high to insure a good profit to the manufacturers, and at the same time permit of the largest possible volume of trade. Most mill and furnace men prophesy a large tonnage for the year, much in excess of any heretofore made. It is reported that among the orders recently taken for rails by the Illinois Steel Co. were those placed by some of the largest Western roads, and that the sales of the past ten days will aggregate about 150,000 tons. This could not be verified at the offices of the company, but is generally accepted as close to the truth. A fairly large tonnage of iron and steel was sold in the holiday week, some of it in quite large lots. The general tendency, however, was to wait until after the first of the year before placing orders, and it is expected that a good many sales which were delayed by the buyers will be placed within the first two weeks of this year. The contract for the Druecker building, in Chicago, placed last week, calls for 1,800 tons of material. More car orders have been given out, and further business of this character is in abeyance.

PIG IRON.—Quite a good business was done last week, by both the Northern and Southern furnaces. Much of the iron sold by the latter went at figures under those we quote. The market is a little lower, as a consequence of the recent sales, although the larger furnaces claim to be getting full quotations at the old schedule for all the iron they are selling. Northern furnaces are as a rule holding quoted prices, but are meeting Southern competition wherever it is necessary. Some of the smaller Southern furnaces are making prices from 10 cents to 25 cents a ton under the figures we quote, which have been reduced from last week. A number of buyers are feeling the market, and a large business is expected to be placed within the next few weeks. Business with the foundries is getting better all the time, and they will undoubtedly use a good deal more iron this coming year than in either of the past two or three years. The agricultural implement manufacturers, who are the largest single users of cast iron in this territory, are selling more of their product than for a long time past, and are expecting a large business in the coming year. The mining machinery builders are all working full time, with excellent prospects for the future. Nearly all other users of cast iron are in equally good shape, and their requirements for the year will surely be as large as they have ever been before. We revise our quotations as follows:

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 85@11 25
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 85@11 10	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—Business in the last week has been satisfactory, considering the season. Several good sized contracts have been placed, and the total tonnage closed was fully as large as for several weeks. The market is not as firm as it might be, but mills are making only moderate cuts from the quotations below, and are endeavoring to put the price list on a firmer basis all the time. Quotations are made at 1.05c to 1.10c for common iron, 1.10c to 1.15c for guaranteed, and 1.15c to 1.20c for soft steel bars from strictly billet stock.

CAR ORDERS.—The largest order placed last week was one for 650 cars given by the C. & N. W. Ry., to the Terre Haute Car Works. Other smaller orders were placed, and further business is being figured on and will be given out soon. The material for the Northwestern cars has been ordered, together with other material, for the smaller lots. The Western roads are expected to buy a good many cars this spring, as their needs are still in excess of their stock.

RAILS AND TRACK SUPPLIES.—The Illinois Steel Co. is reported to have taken large rail contracts in the past 10 days, including orders from the C., B. & Q., Rock Island, Wabash, Illinois Central, Santa Fe, and C., M. & St. P. roads. Most of this business, it is said, was taken at about $18 per ton, Chicago. The steel company is well filled with orders ahead, and holds prices at $20 or higher now. The market generally is firm, and prices are made as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—The local mills are still practically out of the market, being well filled with orders. Outside mills have done very little business in the week. Prices remain nominal at $17 for billets and $23 50 for rods.

STRUCTURAL MATERIAL.—The only contract of importance let last week was for the Druecker building, a warehouse, which will take about 1,800 tons of steel. General business is very fair, although most of it is in small lots. Bridge builders are looking for a good tonnage this year, as a great deal of track elevation will have to be done by the railroads, and some further elevated railway work is expected to come up. The outlook for the year is regarded by all contractors as being very encouraging. Prices are very firm, and have been advanced on beams, channels and tees. They are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Some good orders were placed last week, the total making a very satisfactory tonnage. Generally, business is in small lots, and the mills do not look for very much of an increase for the next few weeks. Some of the mills are said to cut below the market a little to secure desirable business. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.40c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Business has been quiet, and is almost entirely done in small lots. There is not likely to be any very heavy demand before the first of February. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 7½ per cent discount for galvanized.

MERCHANT STEEL.—Orders are limited to small lots from store in most cases, although some good mill orders have been closed. The trade is looking forward to a good year, and is very confident. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The week was quiet, with not a very large business doing. Dealers report a small demand, and are not looking for a much better trade before the middle of the month. Dealers' selling prices are as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	10 50@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 00	Mixed steel, gross	..... 7 00
Dealer's forge, net	9 00@ 9 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	7 75@ 8 25	Old iron splice b., net	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Jan. 5.

The year starts with every indication of activity ahead. The beam pool program of last week was carried out and beams open the year at 1.15c, an advance of $1.00 per ton. Buying in finished material is increasing and the heavy run of inquiries keeps up. Steel billets and bars are also active. The new Homestead wage scale is unsigned in the 10-inch mill and that department has been closed. In other departments the scale has been signed and the works are in operation. The National Tube Works resume Jan. 8.

PIG IRON.—For January deliveries of Bessemer pig, valley furnaces are asking $9.50 and for the first quarter $9.65 to $9.75. Pittsburg iron is relatively weaker at $10. The new year so far has developed no interest in Bessemer and inquiries are light. Gray forge just now is being made in the Pittsburg district faster than it is consumed and can be brought at the same price ruling in the valley—$9. Selling in the valley for ten days has been active and prices are firm. Connellsville coke is firm at $1.65. Quotations are made as follows:

Bessemer, valley	$	9.50
Bessemer delivered Pittsburg District,	10.00 to	10.15
No. 1 Foundry	10.75 to	10.90
No. 2 Foundry	10.25 to	10.40
No. 3 Foundry		10.00
Gray Forge		9 90

BILLETS.—A good tonnage of billets sold during the week, prices in the main being in the vicinity of $15. Transactions are reported as high as $15.25, delivered in Pittsburg, only a small freight charge being included; but $15 represents the present market.

SHEET BARS.—Sheet bars are in good demand and sales of the week have been of good proportions. January brings the expiration of many sheet bar contracts and inquiries are coming in covering the supplies wanted. Sales are reported at $17.25 delivered Pittsburg and $17 maker's mill. In the Wheeling district a sale of 1,500 tons is reported at $17.25, delivered, including a switching charge. The lots taken in the week vary from 500 to 4,000 tons.

STRUCTURAL MATERIAL.—According to the agreement reached by the beam manufacturers in New York last week, beams, 3 to 15 inches are now quoted at 1.15c, 18 to 24 inches, 1.25c. While no tonnage allotments were made on other shapes it was agreed to maintain a minimum of 1c on angles, 1.15c on zees, and 1.20c on tees. A rush of buyers to cover under former quotations followed and sales of this sort are reported. Inquiry continues heavy for all kinds of material.

SPELTER.—Spelter is held at an advance over prices of a week ago, but can be had still for 3.85c.

FERRO MANGANESE.—For domestic ferro-manganese, 80 per cent, $47 to $47.50 is the range of quotation.

RAILROAD AND TRACK MATERIAL.—New rails are quoted at $18 mill; relaying stocks at $15 and $16 and track material as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

IRON AND STEEL SKELP.—Inquiry for skelp is heavier but sales are not large. We quote: Grooved steel skelp, .95c to .97½c; sheared steel skelp, 1.02½c to 1.05c; grooved iron skelp, 1.10c to 1.12½c; sheared iron skelp, 1.17½c to 1.20c.

PIPES AND TUBES.—Pipe mills generally are closed undergoing repairs which were not made last summer. Jobbers for a week past have been eager to buy but their offers have been below current prices and have not been entertained. Mills are holding the base discounts with an extra discount of 10 and 5 per cent on car load lots. Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off. An inquiry is on the market for 130 miles of line pipe for use near Dallas, Tex. Inquiry for oil country goods is unusually heavy.

PLATES.—Mills are quoting Bessemer and open-hearth tank at 1c; shell, 1.10c and flange 1.20c. Estimates are being asked for on a large amount of new work some of which is about ready for bids.

BARS.—Sales of steel bars at 95c are still reported in the face of firm mill quotations of 1c. Bar iron is showing improvement and good sales of common iron are reported. Common bar iron is quoted at .95c to 1c, branded muck bar, 1.25c to 1.30c.

OLD MATERIAL.—Inquiry is coming in for all kinds of old material, but there is still a wide variation between buyers' and sellers positions. Sales of the week were small, the largest reported being 500 tons of old steel rails which brought $10.50, gross. Iron rails are quoted at $13 to $13.50; No. 1 wrought, $11 net; car wheels, $10.50 gross; cast scrap, $9.25 gross.

Personal.

J. F. Wallace, who resigned the position of chief engineer of the Illinois Central Railroad, Aug. 1, 1897, to become vice-president and general manager of the Mathiesen Alkali Co., of Providence, R. I., has returned to the service of the railroad, becoming assistant to Second Vice-President Harahan. Mr. Wallace will be in charge of the engineering department of the road. Because of his views he is known to entertain on the subject, it is thought that his return to the road indicates the intention of its officers to give a more extended use of electricity as a motive power.

John Lambert, vice-president of the Consolidated Steel & Wire Co., celebrated the close of the year by giving to each of the hospitals of Joliet, Ill., his home, $1,500, and by donating to the city $30,000 for a library building, and $7,000 for the library.

E. S. Page, secretary of the Cleveland Rolling Mill Co., has gone to the Bermudas for the winter.

Pittsburg Foundrymen's Association.

The adjourned session of the December meeting of the Pittsburg Foundrymen's Association was held in the Builders' Exchange, Pittsburg, Monday evening, Jan. 3, 1898, and was attended by 15 members. Mr. Yagle, the vice-president, occupied the chair in the absence of President Taylor. In the business session the resignation of James Boyle from the executive committee was received and accepted. The treasurer's report was presented and showed that association finances are in good condition. On motion the association agreed to suggest to the executive committee the advisability of holding a "smoker" in connection with the regular meeting of the association, on Jan. 24.

The executive committee reported that no special paper for the evening had been prepared. The informal discussion of the evening was on the question of sandless pig iron for foundry purposes. It developed that the use of sandless pig iron in foundry practice has not proved as successful thus far as in open-hearth practice, the difficulty encountered being the oxidation of over-heated iron when not protected during the period of heating by the sand clinging to the pigs.

This difficulty, it was suggested, might be overcome in a measure by the addition of a small amount of slag to protect the top of the bath from oxidation. This, however, was shown to protect the iron only after melting is completed and not during the process. The experiences of different members with sandless pig were detailed and opinions seemed to agree that it could be used satisfactorily were some means devised to prevent burning. The probability was suggested of foundrymen being compelled to face this problem in the near future, because of the economy in furnace costs secured through the use of pig iron casting machines. The discussion was participated in by Howard M. Hooker, who introduced the subject, Dr. Richard Moldenke, Wm. Yagle, James McDonald, Secretary F. H. Zimmers, and C. A. Stroh.

King & Andrews Co. Goes to Chicago Heights.

The Chicago Heights Land Association, through M. H. Kilgallen, general manager, has secured the location at Chicago Heights of the King & Andrews Co., which has been doing business for 22 years at 216 to 222 North Union st., Chicago, manufacturing a fine grade of heavy foundry castings, such as engine parts, rolling mill castings, including sand and chilled rolls; kettles, with capacity of 50 tons each, and window sash weights. The company is officered by Rockwell King, president; Martin Andrews, treasurer and general manager, and William Francis, secretary. It has secured eight acres of land in blocks 95 and 96, Chicago Heights, having a frontage of 600 feet on 17th st. and Wentworth ave., and has now in course of erection a brick structure 100x400 feet, with boiler and engine house attached, and a separate building 50x200 feet for the sash-weight department. Fully 150 skilled laborers will find employment in the new plant. The Chicago Heights Terminal Railway will construct two side-tracks to the plant, one to run on trestle-work 18 feet high, so that coke and raw material for the castings may be carried right to the cupola doors, thus saving the important item of cost and loss of time in elevating. Another important saving, that of teaming, will be accomplished by means of the second track. The King & Andrews Co. expects to save in operating expenses fully $18,000 a year. The company has been looking for the last two years for property adaptable to its uses, and finally decided in favor of Chicago Heights.

WM. SELLERS & CO., of Philadelphia, have a cable order from Sir W. G. Armstrong, Whitworth & Co., New Castle-upon-Tyne, Eng., for a No. 2 tool grinder and a drill grinding machine. The same concern has ordered four of the Sellers No. 1 tool grinding machines in the past few months. Such orders from a conservative English firm of world-wide reputation for accurate work are a strong endorsement of the Sellers machinery for tool and drill grinding.

THE IRON TRADE REVIEW

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

JANUARY 6, 1898.

AS GERMAN IRON MASTERS SEE US.

The condensation and translation given elsewhere of the address and discussion at a recent meeting of the Society of German Iron Masters merits attention for several reasons. Heretofore the notes of alarm at American aggression in foreign markets for iron and steel have been in our own tongue. Now that the German iron trade feels aroused to the necessity of action, we find, however, that the diagnosis of the situation is about the same as that presented before English trade and technical associations. Like their English competitors, the Germans deplore their lack of cheap transport, of rich ores and superior coke, of hopper bottom cars and other adaptations of railroad equipment to industrial needs. The advantages of the iron manufacturers of the United States in respect to labor cost are also emphasized by this German body as they have been by British iron and steel associations. But there is this difference. While our British friends appear to envy American manufacturers because of what they seem to regard the more "tractable" disposition of employes here, and complain of the seriously hampering exactions of English trade unions, our German critics bear heavily upon the treatment of workingmen in the United States, and regard our regime in this respect as not one they would covet. Mistaking the lower tonnage rates in this country for a lower day's earnings, the secretary of the Society of German Iron Master ignores the advantage American steel works employes enjoy in the prodigious outputs secured by improved machinery. So far as day's wages are concerned, there have been no radical changes in the past three years. Where reductions came there have been restorations, compensating at least in part. As for the references to the paternal features of the labor system in German steel works, however desirable these are from some points of view, the American workman does not take kindly to them. He prefers, as a rule, to make his own insurance investments; and efforts on the part of employers to administer for their employes in other particulars, are not encouraged here. The Pullman experiment is a monument to the sentiment of American wage-earners on that point.

As for the estimates of the German iron association secretary, on the cost of iron-making in the United States, there is no failure to credit us with remarkable achievements. The tendency is the same that appeared in iron trade circles here, early in 1897, when pig iron costs were figured on the basis of a mixture 100 per cent Mesabi ore, at about $2 a ton at Lake Erie part. To put $7.25 as the cost of Bessemer pig iron at Pittsburg is to assert what has not been approached in the best practice in that district. These sensational cost statements may circulate as nine-day wonders, but nothing is gained by them for a correct understanding of the situation.

One statement brought out in the discussion of Mr. Schroedter's address shows some appreciation of what actually has taken place in the United States. We refer to the remark that in the United States the high wages have stimulated invention of labor-saving appliances, in the competitive struggle for the lowest cost. The very abundant supply of unskilled and therefore cheap labor in Germany has postponed and will long postpone the introduction of American types of economizing equipment.

The assertion that American iron and steel workers suffer from long shut-downs is truer as applied to some other years than to 1897. And the tendency, as seen in the operation of certain plants the past year, promises to be more and more toward steady and full employment of men and equipment. The foreign business of 1897 has helped to this end; the operations of 1898 may be expected to emphasize this factor in low costs. Our steel manufacturers appreciate as those of no other country the value of heavy tonnage as a divisor into fixed charges.

It is to be noticed that the German students of the situation, like those in England, are not hopeful of early changes in conditions which they admit are seriously handicapping them. In both countries transportation equipment and methods are conceded to be far below the American standard; yet in both there is a disposition to consider that any early or radical changes are unlikely. In other words, English and German manufacturers look upon the United States as a dangerous competitor in the world's trade in iron and steel, but at present are making no tangible preparations to meet the attack. The situation is one which our manufacturers may well regard hopefully, while they determine for 1898 to push their advantages with greater vigor and confidence.

J. W. SCULL & Co. have opened offices at 812 Hamilton Building, Pittsburg, and will deal in scrap, mill cinder, etc.

THE Penn Bridge Co., of Beaver Falls, Pa., has been awarded the contract for building the state bridge over the Juniata River at Birmingham, Pa.

THE Shelby Steel Tube Co. is said to have secured a two-acre site at Greenville, Pa., on which a new mill is to be erected by the consolidated tube interests.

THE Westinghouse Air Brake Works at Wilmerding started in on double turn on Monday.

LOCOMOTIVE AND CAR BUILDING IN 1897.

Reports from all of the contracting locomotive shops show that in the year 1897, 1,251 locomotives were built. This is a gain, although a small one, (less indeed than we had expected) over the preceding year, when 1,175 were built. In 1895 the engines built by these shops amounted to 1,101 in number and in 1894 to only 695. That was the lowest output recorded for a considerable number of years, and even in 1897 the number of locomotives built has not got back by a good deal to what it was before the panic of 1893. In that year 2,011 locomotives were built, the year before 2,012, and in 1891, 2,165. Of course the reader will understand that these are the engines built by the contracting shops and not by the railroad shops. In fact, it is impracticable ever to ascertain the number of locomotives built in any one year in the United States at the railroad shops. The best that can be done is to get in course of time the net increase in locomotives from the statistics collected by Poor and by the Interstate Commerce Commission, but even those do not give the number built; they are net figures. Of the 1897 locomotives, 143 were compounds, or 11 per cent of the total. Out of the 1,251 locomotives built in 1897, 386 were built for export. In 1896 the same companies reported 309 as built for export; that is, in 1897, 31 per cent of the total was ordered for export and in 1896, 26 per cent. It will be observed that this export business is important and growing. The Government reports of locomotives exported for the fiscal years ending June 30, give, in 1897, 58 in number and $373,245 in value. These increased in number and in value to 1891, when the number exported was 275, and their value was $2,424,363. For the next three years the export fell off, but in 1895 it began once more to gain, and in that year the number ran up to 252 and the value to $2,379,519. In 1896 (year ending June 30) the exports of locomotives amounted to 261 in number and $2,512,270 in value. In the 10 months of the calendar year, including October, the locomotive exports in 1896 were $2,666,000, and in 1897 they were $2,750,000 in value.

Official reports from 30 contracting car building companies and estimates from five others show that the number of freight cars built in the year 1897 has aggregated 43,588, which is considerably less than the number built in 1896, namely, 51,189. In 1895 the total built was 38,100 and in 1894 it was only about 18,000. In 1890, the best year for car building, so far as our records show, the output of freight cars was 103,000, but in each of the years 1891 and 1892 there were built nearly 100,000. It will be seen, therefore, that the year just ending has not been a very prosperous one for the contracting car builders as compared with any recent years, excepting the two or three years of the silver panic.

We find among the companies reporting one which built over 7,500 cars and three others which built each more than 5,000. There are four companies building between 1,000 and 2,000, and each of the remaining companies has built but a few hundred, most of them less than 500. The average built by all of the companies reporting and estimated is 1,282 per company. We find that these same companies have built 494 passenger cars, or 20 more than they built in 1896 and 64 more than in 1895. This again is a poor showing as compared with the early years of this decade, when the output ran from 1,500 up to 2,200 passenger cars per annum.

We have reports this year for the first time of street railroad cars to the number of 2,107. This, however, is certainly much below the number actually built, for our reports come from very few concerns outside of those which build steam railroad cars as the most important part of their work. We have no reports from the larger street car builders.—[Railroad Gazette.

THE American Pig Iron Storage Warrant Co. has sent out to holders of warrants a statement concerning its dispute with Alabama officials over the taxation of iron in warrant yards in that State. An act was passed last year creating a back tax commission, which is charged with collecting taxes on property unlisted in the past five years. The warrant company was notified to pay taxes on the iron in its yards, but replied that it did not own the iron. The assessors thereupon levied a tax on the "unknown owners," valuing the iron at $6 a ton. Protracted negotiations followed and a compromise valuation of $3 a ton was agreed upon. The annual tax thus amounts to 37 cents a ton for state and county taxes and 1½ cent additional where the yards are within city limits. The warrant company has raised its storage charge from 2 cents to 2½ cents a month, guaranteeing to protect the holder against the payment of all taxes.

1897 IN THE IRON TRADE.

While 1896 ended and 1897 opened with disappointment and apprehension dominating the iron trade, the close of 1897 and the entrance upon 1898 are marked by satisfaction in the review of the completed year, and abundant hopefulness in the outlook. The preceding year is remembered as the year of pools; 1897 as the year of largest emancipation from pool influences. Outside of the agreement between the producers of Bessemer ores on ranges other than the Mesabi, no arrangements fixing prices and outputs survived the year; and the ore agreement was so mild in its price feature and has so fully met the needs of the trade in respect to output, that it scarcely deserves to be named in the pool category. In February, the rail association collapsed, after an existence of 10 years, in which its power was maintained in a way unparalleled in pool history. In the second week of May, the beam pool, whose existence had been precarious for some time, was formally dissolved. Unexpectedly, the last week of the year brought its revival, and with so conservative an advance in prices as to give some promise of holding together. In the past three months the wrought pipe and tube manufacturers have maintained closer relations than for some time, but on no stronger basis than a gentlemen's agreement as to prices.

The year has seen unprecedentedly low prices for Lake Superior iron ores, the Norrie ore, heretofore a basis of reckoning, selling at $2.65, while a Mesabi ore of like analysis sold at $2.10 on Lake Erie docks. Connelisville coke opened the year at about $1.50, and in the second quarter contracts were made at $1.30 to $1.40, and in a few instances as low as $1.25. In December $1.75 was announced as the price for the new year, with contracts reported at $1.65.

Apart from the market history of the year, as told in the record of price fluctuations given in the following pages, 1897 will be remembered chiefly for the opening up of a considerable export trade in finished iron and steel and the expansion of the export of pig iron, so well begun in 1896. Though official figures for the last two months are not available, those for 10 months indicate that more than 200,000 tons of pig iron went abroad and well above 300,000 tons of rails, billets, bars, wire, nails, pipe and other finished forms. Another feature of the year, closely related to the export movement, was the attainment by the leading steel makers of the lowest costs ever known in their history, control of ore supplies and transportation facilities and the largest employment of labor saving appliances, affording economies that have been the wonder of European competitors. These developments make 1897 the beginning of an era of world-wide extensions of American trade, such as had not been dreamed of under the old regime.

A good measure of the iron trade in 1897 is found in the course of pig iron production. From the general apprehension with which the year opened there was a slight recovery, after the closing of the enormous rail tonnage of February. Then came several weary months of uncertainty, of falling prices and lessened production. But August brought the passage of the tariff bill, and the setting in of the tide of crop prosperity that has risen higher and higher with each succeeding month. The following statement shows the active blast furnace capacity on the first of each month in the year, and in the right hand column the corresponding annual rate:

Date.	Furnaces in Blast.	Weekly Capacity. Long Tons.	Yearly Equivalent, Long Tons.
January 1	154	159,720	8,305,000
February 1	154	162,959	8,474,000
March 1	156	169,986	8,839,000
April 1	153	173,279	9,010,000
May 1	146	170,528	8,867,000
June 1	146	168,380	8,756,000
July 1	145	164,064	8,531,000
August 1	152	165,378	8,600,000
September 1	161	185,506	9,646,000
October 1	171	200,128	10,406,000
November 1	183	213,159	11,084,000
December 1	191	226,024	11,753,000

The diagram on page 9 indicates the changes in prices of representative products in 1895, 1896, and 1897. The average of weekly quotations is taken for each month, and the intersections of the traversing lines with the vertical lines represent the price averages for the months opposite the latter.

The boom period of 1895 contrasts sharply with the comparative evenness of the lines for the past two years, except where the crashing of pools is marked by a sudden descent.

The improvement in August of 1897, culminating in October, and the slight falling off in prices in the past six weeks are plainly shown. The prices given for tank plate, beams and bar iron are for net tons. The table of averages from which the 1897 lines are plotted is as follows:

AVERAGE MONTHLY PRICES OF IRON AND STEEL PRODUCTS IN 1897.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Local No. 2 Fdy., Chicago	11.00	10.75	10.75	10.75	10.25	10.00	10.00	10.00	10.25	10 75	10.75	10.50
Gray Forge, Cincinnati	9.35	9.05	9.00	8.75	8.00	8.25	8.25	8.50	8.90	9.10	9.25	9.25
Tank Plate, Chi., net ton	25.00	25.00	25.00	24.25	23.00	22.00	22.00	22.00	22.75	24.25	25.00	23.00
Billets, Pittsburg	15.25	15.50	15.50	14.75	14.00	14.25	14.00	14.15	15.75	16.50	15.75	15.00
Beams, Pittsburg, net ton	31.00	31.00	31.00	31.00	26.50	21.25	20.00	20.00	20.25	22.00	22.00	22.00
Bessemer Pig, Pittsburg	10.50	10.65	10.50	10.00	9.35	9.35	9.00	9.05	10.00	10.25	10.25	9.50
Bar Iron, Cleveland, net ton	23.00	21.25	21.00	19.50	19.50	17.75	18.50	19.75	20.20	21.75	20.75	20 00

In the table below the prices at the beginning and end of the year, and for the lowest and highest weeks of the year, are given for the same products:

	Jan. 1, 1897.	Lowest Week, 1897.	Highest Week, 1897.	Jan. 1, 1898.
Local No. 2 Fdy. Iron, Chicago	$11.25	$ 9.50	$11.00	$10.50
Gray Forge, Cincinnati	9.50	8.00	9.50	9.00
Tank Plate, Chicago	25.00	22.03	25.00	23.00
Billets, Pittsburg	15.00	14.00	16.50	15.00
Beams, Pittsburg	31.00	20.00	31.00	23.00
Bessemer Pig, Pittsburg	10.75	9.00	10.80	10.00
Bar Iron, Cleveland	23.00	17.00	23.00	20.00

THE CHICAGO IRON MARKET IN 1897.

At the opening of 1897 Chicago dealers in iron and steel products did not entertain especially high hopes of the future; many were positively pessimistic. Heavy bank failures, locally, were of recent memory, and had the effect of making the general business world cautious. On all business coming up there was fierce competition as the consumption was at a much smaller rate than the capacity of the various plants. Crops had been enormous, and the railroads were assured of a large business in hauling them, and the belief was general that this would lead to the placing of large orders by the roads during the year. Other consumers, however, showed no disposition to come into the market, and it was not thought that the general needs of the country would be anything like its productive capacity. For two years before the Chicago market had shown a falling off in sales, as the agricultural trade, the basis for nearly all business in the West, had been exceedingly small. It was hoped that the large crops just harvested would improve these conditions, and make the farmers heavier buyers of material; yet it was felt that it would take them a long time to recover from the period of small crops and low prices just over. It was largely the rapid increase in the values of agricultural products which placed the West on a better financial footing, and enabled it to buy materials of all kinds, which it had needed for so long, and perforce had been obliged to do without. Early in the year, the steel rail association, which had controlled the prices and output of rails for so long, was dissolved, being unable to withstand the pressure for lower prices. This was followed at once by an influx of orders from the railroads for rails, and took a large tonnage of the productive capacity out of the market for nearly all of the year.

As a consequence of the small demand for steel and iron during the first half of the year, a determined effort was made by the producers to increase their foreign trade, and large sales of various grades of raw and manufactured metals were made to foreign consumers. In May the beam combination dissolved. Then the coal miners started their strike, which lasted for so long a time. Consumption had been increasing slowly but surely all the spring, and by the end of May dealers were beginning to prophesy a return of good times. In June and July the demand for all kinds of material had increased to large proportions, and prices commenced to show improvement. Railroads ordered a heavy tonnage of material for bridges, and other structural work was good. Considerable orders were placed with the lake shipyards, making a demand for the steel products entering into the construction of vessels. In August commenced the buying of cars by the railroads, caused by a decided shortage in cars of all kinds, making it exceedingly difficult for the mills and furnaces to make shipments of their products. Other consumers were also heavy buyers of material, and trade was larger than it had been in any previous month of the year. Values increased to some extent, also. September and October, particularly the former, were characterized by an exceedingly heavy trade in all kinds of material. The railroads continued to be large buyers of cars, and of the materials entering into them, and business from all consumers showed a decided increase over the earlier months of the year. In November, trade was nearly as good as in the two months before, and was very steady. Railroads commenced to figure on their needs for rails for 1898, and some placed orders, although they were not large. In December the tonnage of rails placed with the mills was very heavy, satisfying the makers that the prospects for the coming year would enable them to secure higher prices, and they were advanced accordingly. Other classes of material were in lighter demand than in the immediately preceding months, but still orders were of an unusual size for the season.

Pig Iron.

The year opened with a small demand for pig metal from the local consumers, principally because so many of them had placed large orders early in the fall of 1896 with the idea that business after the election would enable them to increase considerably the sales of their products. Their expectations were disappointed, however, and with most of them business was very light until several months later. It was not until the end of February that the foundries commenced to take in their purchased iron with anything like promptness. In March the Southern producers made a more determined effort to secure trade, with the result that large orders for Southern irons were placed. The local furnaces were not in position then to make long-time contracts, as their ore and labor schedules for the year were still unsettled. In April, however, Northern furnaces lowered their prices somewhat under the lower prices for ore and lower lake freights and were successful in getting more nearly their share of going business. The Southern freight rates were reduced at this time 40 cents a ton, to $3.25. In May business improved considerably and in June very large sales were made, principally by the local furnaces, although the Southern producers also secured a good business. Two months before the Lake Superior charcoal iron producers had united in one selling agency, with headquarters at Detroit, and with the loss of several charcoal iron agencies, the local agents arrayed themselves against that trade, endeavoring, with a measure of success, to replace charcoal iron with coke iron. The local producers turned their attention to the soft iron trade in July, announcing their intention of making a grade of softener to compete with that of the South. The latter part of August, after considerable discussion, the local and Southern producers held a consultation in Chicago regarding the prospects of the trade, with the result that prices were advanced on all grades from 25 to 50 cents a ton. September and October business was very heavy, so much so that the furnaces had difficulty in keeping up shipments to their customers. November and December trade was not so large, but was still very satisfactory, and for the season of the year was unusual.

Steel and Finished Material.

The rail association which had been in existence since 1887, maintained prices steadily at the same level throughout 1896, until in December, when a reduction from $29 to $28 was made. Early in 1897 the association showed evidences of weakness, and in February was completely ruptured, with the result that rails were sold at a lower price than ever before in the history of the trade. Coincident with the break of the rail pool large sales of rails were made to nearly all the railroads of the country, most of the business being placed at from $16 to $18 per ton. The enormous tonnage placed almost immediately filled the mills with orders running into the summer, and the low prices were withdrawn, and quotations were advanced to $21, Chicago. In May the price receded again to $19 on large orders which were sharply competed for by the various mills. During the summer very little business was done, and the market was very quiet. In the early fall the demand increased materially, causing an advance to $20. Prices of billets did not vary a great deal throughout the year, except in the summer months, when they fell lower than ever before, though meantime the output of the local steel works in finished forms had become so large that they had comparatively a small tonnage of billets to put on the market, outside of their contract with the Waukegan interest. In early Sep-

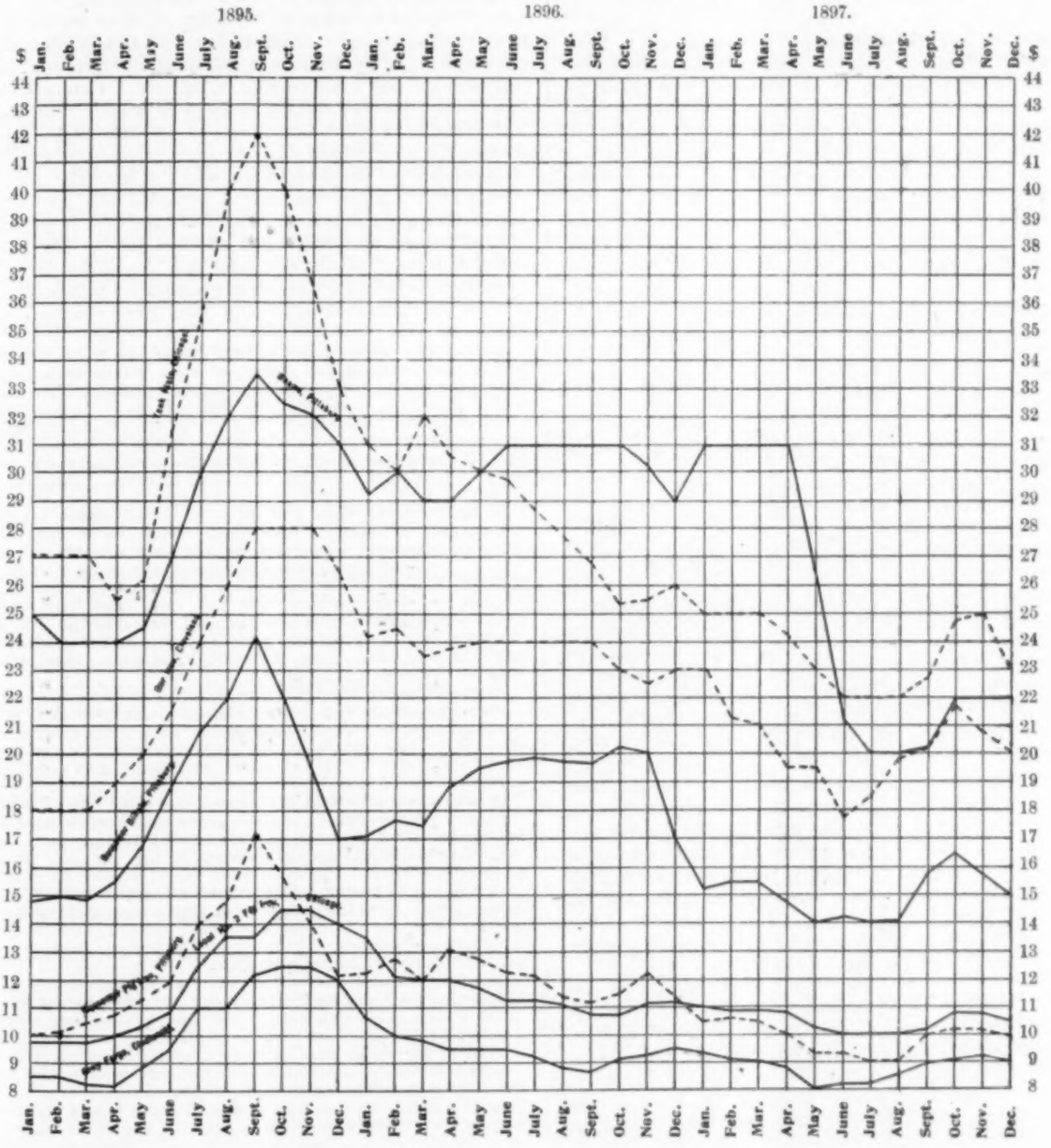
tember a very heavy demand for both billets and rods came up, causing a decided advance in values. Sales were large throughout the balance of the year. The bar iron and steel trade was helped materially in the year by the very large number of cars ordered and built by the railroads centering here, and by the increased demand for agricultural machinery and wagons, and other articles used by the agricultural trade. By far the larger demand for structural material came from the bridge works, which had extensive orders from the railroad systems for bridges, track elevations, etc. Very few large buildings were erected in the city, making this branch of the trade smaller than for several years past. Machinery, spring and tool steel tonnage was also increased by the agricultural demand, and sales of these classes of material were larger in the year than ever before. The foregoing table shows the average prices for each month of the year on certain leading grades of iron and steel, all f. o. b. Chicago.

PITTSBURG IRON TRADE IN 1897.

Although the year opened inauspiciously and was marked during its early months by events of a revolutionary nature, the round-up of the 12 months is in many respects satisfactory and the outlook even more promising. The first six months of comparative leanness are overshadowed by the plenty that came later and which appears to be only the beginning of returning activity. The slack business early in the year forced Pittsburg manufacturers to operate in foreign markets on a scale never attempted before, and the results have been most gratifying. Branch offices in London have been established during the year by the National Tube Works Co., and the Carnegie Steel Co., Ltd., while through special representatives, South America, Central America, China and Japan have been reached. Pittsburg engineers and metallurgists have done important work also in Russia.

On October 4 the Pittsburg, Bessemer & Lake Erie Railway was opened, thus giving Pittsburg another route to Lake Erie. The acquisition of additional iron mining prop-

DIAGRAM OF PRICE FLUCTUATIONS IN IRON AND STEEL IN 1895, 1896 AND 1897.



MONTHLY AVERAGE PRICES OF IRON AND STEEL, CHICAGO, 1897.

	Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
L. S. Charcoal..	3.50	3.50	13.50	13.50	13.00	13.00	13.00	13.00	12.50	12 50	12.50	12.50
Northern No. 2 Pdry.....	11.00	10.75	10 75	10.75	10.25	10.00	10.00	10.00	10.25	10.75	10.75	10.50
Southern No. 2 Pdry.....	11.00	0.65	10.50	10 25	9.75	9.75	9.75	9.85	10.00	10.60	10.60	10.60
Bars	25.00	25.00	22.00	21.00	21.00	20 00	21 00	22.00	22.00	22.50	22.00	21.50
Rails.....	26.00	22.00	19.00	21.00	21.00	20 00	19.00	19.00	19.35	20.50	20 50	20.00
Beams.....	34.60	34.60	35.00	34.00	30.00	23 00	23.00	23.00	23.40	26.00	26.00	26.00
Tank Plates.....	25.00	25 00	25.00	24.25	23.00	22.00	22.00	22.00	22.75	21.25	25.00	23.00
Billets.....	18.00	7.50	18.00	16. 0	16.50	16.00	15.00	15.75	16.75	18.00	17.50	17.50
Sheets No. 27...	43.00	42.00	41.00	40.50	40.00	38.50	39.00	40.50	40.50	42.50	44.00	43.00

erties by the Carnegie Steel Co. Ltd.,—the Norrie and Tilden mines on the Gogebic range—was another feature of the year, further emphasizing the tendency of large producers to make themselves secure against fluctuations in the cost of their raw materials.

By death the iron and steel trades of Western Pennsylvania lost in 1897, M. K. Moorhead, formerly of the Moorhead-McLean Co.; H. W. Borntrager and J. W. Vandervort, of the Carnegie Steel Co.; Edward D. Reis, of the Rosena Furnace, New Castle; Col. James Andrews, prominent in bridge and jetty construction; and Chas. E. Orr, of Robinson & Orr.

Pig Iron.—Bessemer pig iron in the year 1897 touched $9.25, delivered in Pittsburg—the lowest point ever reached. This price was made in May after an irregular but persistent decline from $10.75 and $11, quoted January 1. Again in July, Bessemer iron was offered as low and even lower but no sales were made. With later August came a better outlook and in September the blowing in of Mahoning and Shenango Valley furnaces, idle in some cases for more than a year. A large share of the year's buying was done in September and prices rose to $9.75, valley. The last four months brought a healthy activity, and although every one of the 30 furnaces in Allegheny county was active on Nov. 1, the tremendous output was absorbed by steel interests. Furnaces 3 and 4 of the Duquesne group of the Carnegie Steel Co., Ltd., were blown in within the year and the former produced 711 tons of iron in 24 hours on Oct. 7, thus exceeding the world's record. An addition of two more furnaces to the Duquesne plant is a possibility of the present year. As indicating the need of the larger pig iron production of the past year reference should be made to the fact that at Homestead in 1897 was begun the erection of 10 40-ton open-hearth furnaces by the Carnegie Steel Co., Ltd., while Jones & Laughlins, Ltd., completed the erection of six open-hearth furnaces.

Of interest also in pig iron was the perfection of the Uehling method of casting pig iron. This system was introduced within the year in Pittsburg and is now being installed in furnace plants both in the United States and Europe.

Billets.—Within the year Bessemer steel billets went from one extreme to the other. The pool had broken in December, 1896, and in the rush for business, wants were covered for months ahead. The nominal quotation of $15, maker's mill, on Jan. 1 gradually receded ro $13.75 and $14, quoted at the end of April. The coal strike late in July, by disabling Wheeling district plants, put some life into the Pittsburg billet market, but more particularly into sheet bars, which sold on Aug. 19 at $16.50. With September came steady buying and the hungry mills, fearing a reaction, booked far beyond their capacities. As fall buying advanced, a difficulty in getting material arose and as it became more marked prices rose. Billets on Oct. 1 held at $15.50 and $16 and sheet bars sold as high as $18, for prompt shipments. The climax was reached late in October, when billets were sold by middlemen for $16.50 and sheet bars at $18.25. The last month of this year brought sales of 40,000 tons of billets—partly speculative—at prices ranging from $14.50 to $15.

The rebuilding of the Bellaire Steel Works (Bessemer) was completed within the year and the Braeburn Steel Works at Braeburn, Pa., (crucible and open-hearth), and the Buhl Steel Works (basic open-hearth) at Sharon, were put in operation.

Plates.—The adoption during the year by the Pittsburg, Bessemer & Lake Erie Railway, of freight cars built entirely of steel, not only developed the largest individual plate order of the year but also opened a new avenue for plate consumption. The first order of the Bessemer Railway for 600 cars made necessary the purchase of 9,000 tons of steel—largely plates. Another new source of plate demand developed in the year is exemplified in the steel grain elevator erected at Buffalo, by Riter & Conley, of Pittsburg, for the Great Northern Railway. In its construction 3,700 tons of plates were used, besides 1,200 tons of shapes. Of interest also, in plates, is the announcement that the Carnegie Steel Co., Ltd., will shortly begin the erection at Homestead of the largest universal mill ever constructed. Ground has already been broken. Prices on plates fluctuated but little during the year. From 1.10c, for tank, quoted Jan. 1, prices weakened gradually to 1c; were advanced in February to 1.10c to 1.15c, then gradually weakened again and held at about 1c, until the lively buying of the early fall again made 1.10c the ruling price. Among the large contracts now under discussion is one from the Australian gold fields, in which, should the government plans be carried out, 66,000 tons of riveted plate will be bought.

Structural Material.—Bridge work developed the heaviest structural contracts of 1897. The largest of these was the Canadian Pacific bridge at Montreal, the 20,000 tons of plain material for which came to Pittsburg after a prolonged fight. Earlier in the year a bridge over the Susquehanna River at Columbia, Pa., calling for 9,000 tons of material, and a terminal depot at Boston, 6,000 tons, attracted lively bidding, and both went to Eastern mills. Late in December another bridge —the Manhattan viaduct in New York—was let and the 6,000 tons of material was taken by Pittsburg. Prices on beams were to outward appearances, steady at $1.55, the agreed rate, until the last of April when traces of evasion of the agreement appeared. The pool broke on May 12, and for a fortnight the four Western manufacturers held the price at 1.25c, Pittsburg. This lasted but a short time, however, and the market soon dropped to 1.10c where they remained practically without change, until the last week of the year. A meeting held in New York Dec. 28, resulted in the revival of the pool, with two Pittsburg and four Eastern mills as members. A price of 1.15c, Pittsburg, was established, effective Jan. 1. The year ended with one Pittsburg structural mill closed for lack of immediate orders, but the work in prospect for both mills for the new year is heavier in tonnage than has been seen for years.

Rails.—In rails the year has been one of the most notable and revolutionary in the history of steel rail manufacture. The rail pool—so long impregnable—held standard sections at $25, Pittsburg, in the opening weeks of 1897. Cutting was charged against Eastern mills and on Feb. 8 the collapse came. A temporary price of $20 was made but $17 Chicago and Pittsburg was almost immediately quoted and there followed a battle for supremacy, notably between Chicago and Pittsburg mills. Within two weeks over a million tons of rails had been sold East and West, of which about 475,000 tons came to Pittsburg. Sales in the majority of instances were accompanied by options on the year's wants of the buyer. Prices dropped under the fierce competition to $17, Chicago, the seat of the battle, this price netting Pittsburg, in some instances, but little over $15, mill. The large sales in the succeeding months were 65,000 tons rolled at Edgar Thomson for the Canadian Pacific Railway, and a good tonnage for the Lake Shore Railway. The year closed with standard sections quoted at $18, mill.

Bars.—The bar iron trade was in some respects the least satisfactory of the year. Very little demand, low prices and much annoyance over puddling scales were met throughout the year. The Merchant Bar Iron Association's price of 1.15c, Youngstown and Cleveland, was withdrawn in February and prices dropped in succession to 1c, .95c and .90c. The fall revival affected bar iron less than other lines, though the price did advance to 1c, but again weakened somewhat before the end of the year. In nearly all Pittsburg mills the maximum puddling rate was reduced during the year from $4.50 to $4 per ton. The September record in steel bars was so good that Pittsburg mills at times were two months behind orders. With the exception of September and October, however, the year's business was small. Prices touched 1.10c in September and later fell to 1.05c. During the rest of the year 1c was the Pittsburg quotation.

Sheets.—The first half of the year was perhaps the worst, and the last half in many respects was the best period seen in the Pittsburg sheet trade. Until July prices were weak, 1.80c being the quotation for No. 26 black sheets. The delay in settling the wage scale and an unusual series of serious accidents to mill equipment when the scale was finally settled, threw the mills far behind orders. Prompt shipments became a luxury and of Nos. 27 and 28 there was a famine. Similar conditions in sheet bars added to the delay until in early November 2.25c was paid for early shipments of No. 28. In a majority of instances the operation of Pittsburg sheet mills during the last six months was the fullest in their history. Early in the fall the sheet manufacturers made No. 28 the base from which prices are reckoned and a price of $2.05 was agreed to. With few exceptions this quotation has ruled since. Galvanized sheets were fairly steady throughout the year, showing few changes in prices.

Pipes and Tubes.—In July all the leading pipe interests were compelled to reduce wages 10 per cent, owing to the poor business of the year. So much did conditions improve, later, that this cut was restored late in August. Fall business in merchant pipe and oil country goods was large and in boiler tubes was unprecedented. Within the year export business was taken by the Pennsylvania Tube Works for Germany; by the American Tube & Iron Co., for South Africa, while the National Tube Works established a sales agency in London with good results. Base discounts were changed in October, and, excepting merchant pipe, prices since have been steady.

AMERICAN COMPETITION IN THE WORLD'S IRON TRADE.

BY DR. RICHARD MOLDENKE.

The average American citizen does not take special notice of the storm brewing among European nations, whose industrial conditions are becoming desperate under the burden of enforced armament. Even now a determined commercial war has been opened for the supremacy of the world's trade. Every point gained by the United States deepens the animosity growing against us. The fact that we are carrying coals to New Castle, so to speak, and are selling certain classes of iron and steel below the cost of European production in the English and German markets, make an official utterance by persons competent to judge worthy of our closest attention. The engineering labor dispute in England, which is causing so much loss to that nation at the present time, may give us little immediate concern, the supremacy of the Briton on the high seas and in the carrying trade being the ever present elements to be watched. Again the personal characteristics of the English iron worker render him incapable of the intense effort we daily see in our American mills. With the Germans the case is entirely different. Germany is seeking an increased outlet for its surplus products. Her colonies in Africa are in their infancy and their trade as yet insignificant. The German workman thinks, and plods along conscientiously, steadily improving, as opportunities enable him to do so. Combine this with the business acumen of his employer, far ahead of ours so far as capturing foreign trade is concerned, and we have in the field so strong a competitor that only cheaper raw materials, improved methods, and the system of desperate driving in our mills enable us to hold our own and even become the aggressors. In view of the above the recent address of Mr. E. Schroedter, secretary of the Society of German Iron Masters, as well as editor of *Stahl und Eisen* is given in substance herewith as taken from a recent issue of *Stahl und Eisen*. The reader will kindly imagine Mr. Schroedter repeating his address in a condensed form:

While Europe was but recently shipping quantities of manufactured products to the United States, and received in return only a few specialties of no particular importance; while the world's markets were practically untouched by Americans; at the present day the conditions are reversed. The balance of trade is in favor of the United States, amounting in exports to three and one-half times the imports. Germany was in the habit of exporting great quantities of wire, rods, billets, beams, railway material, etc., but our trade with the world at large, and South America and Eastern Asia in particular, is not only beginning to suffer considerably as a consequence of American competition, but we are actually threatened with the importation of pig iron and steel billets into our own domains. Though the matter is just developing, yet this remarkable reversal of trade conditions unparalleled in the world's history, is of sufficient importance to warrant close study.

First we will give a general outline of the conditions affecting the iron industry of the United States. We find the ores grouped together in two principal regions, the more recent developments in Alabama, Tennessee, Virginia and Kentucky, and the Northern region from the Atlantic to Lake Michigan. The Eastern portion of this vast territory consisting of New York, New Jersey and Eastern Pennsylvania, seems to be unable to compete with Pittsburg and Chicago, so far as ores are concerned; though Troy, Steelton, Sparrow's Point and Bethlehem are embraced within this subdivision. Possibly Edison may realize something with his $2,000,000 concentration plant, and enable mine owners to work successfully the poor grade ores within easy reach. The center of the pig iron production of the United States seems to be slowly drifting to Pittsburg. Even if the records made with the blast furnaces are to be taken with a grain of salt, they nevertheless excite our admiration. While this is the case with the pig iron, the center of ore production unquestionably is located in the Lake Superior region. The United States is well known to be very rich in iron ores, nearly every State having ore deposits. In the Northeastern region the output of ore is steadily declining and rapidly giving way to the enormously increasing production in the Lake Superior region. The Southern ore regions are remarkably well situated for the cheap production of pig iron, and were it not for a number of drawbacks, they could be characterized as the Eldorado of the iron industry. The climate is unfavorable, the labor supply unsatisfactory, and the ore is unfortunately of the non-Bessemer variety. The phosphorus in the ores is too variable to give good basic Bessemer steel; there is too much sulphur in the resulting pig iron, and this is not very uniform, either. The average iron contents of Southern ores is 44 per cent, as against over 60 per cent in those of the Lake Superior region. Finally, the ores are very silicious and hence not easily reducible.

Comparing these conditions with those of the Lake Superior region, we find the ores rich, pure, and easily reducible, thus allowing a forcing of the blast furnace. The various districts producing ores have been often described and statistics plentifully given. The enormous production of the Mesabi range is practically all non-Bessemer [On this point, as on some others, the speaker is quite astray.—Ed.], but the ore is of so fine a grain that it is specially desirable, and this accounts for the rapid expansion of the basic open-hearth steel production. Very simple and inexpensive methods of exploiting these ore beds are in use, the work being principally done with steam shovels, sometimes at the rate of 1,000 tons an hour with one machine. As the cost of mining is not over 10 cents per ton and about 25 cents is paid for royalty to the owners, the cost of the ore on the dump is very low indeed. Transportation is by way of rail to Duluth, Two Harbors, Ashland, Marquette, and Escanaba. From the vast docks at these places, the ore goes per "whaleback" and other ore vessels to Cleveland, Chicago, Ashtabula Conneaut, etc. To show the immensity of the lake trade it may be stated that in 1896 30,000,000 tons of freight passed through the Detroit River. Freightage is cheap and the unloading of the vessels rapid. A ship holding 2,500 tons of Mesabi ore was unloaded in 70 minutes, and sometimes 40 trips are made in the season. These facts clearly show why ores delivered at Cleveland and at Chicago are so cheap. The new Carnegie railway (P. B. & L. E.) has made the Carnegie interests independent of the various lines between Lake Erie and Pittsburg; the expectation being to lay down ores at the blast furnaces for $2.50 a ton. Taking up the coke question we find the Pittsburg furnaces drawing from the Connellsville region a cheap and high grade fuel. Coal is cheap and easily gotten, and the coke, which in 1896 amounted to 8.2 millions of tons is made in 18,000 ovens. The price occasionally drops down to $1 a ton, but for the last 15 years averaged $1.25. Taking this as the current figure we have the following as the present cost per ton of pig iron in Pittsburg:

1.6 tons ore	$4.00
Coke	1.50
Limestone	.50
Labor	.75
Expenses	.50
	$7.25

or exactly as much as the ore alone cost in 1884. We can therefore readily understand why steel billets can be sold at $13 to $14 without loss. Now that the Carnegie Steel Co. has completed the chain, and secured its hold on the market by the purchase of the Norrie and Tilden mines, which give it the pure ores necessary as additions to the Mesabi material, it has the facilities for producing finished steel of excellent quality cheaply and in enormous quantities. So far as Europe is concerned the Carnegie Steel Co. can be looked upon as a formidable opponent, just beginning to feel his power, and if the footsteps of the Standard Oil Co. are followed, all opponents are certain to be crushed, and the American iron market controlled.

We have now seen the main cause for American success is the saving made in the freightage of raw materials. The greatest distances are being traversed with comparative ease. Knowing this we must accustom ourselves to the idea that bringing American products to the seaports for export will not be a serious matter either. In the Southern region transportation charges to the Gulf, and in the Northern to New York and Baltimore, are very reasonable. Ocean freights vary considerably, ranging from $1 to $4 a ton, the price depending upon the supply of vessels available. Heavy grain shipments notably make rates reach higher levels.

The rapid development of the American iron industry is giving us every reason for close study, for not only are the world's markets being invaded, but Southern pig iron and finished steel products are already to be met with in Germany. Whether the making of pig iron in Alabama for $6, or in Pittsburg for $7, with the cost of billets at $13 is feasible or not, the fact remains that a remarkable economy has been obtained in the United States in the last few years, and a glance at statistics giving average prices for pig iron and ingot steel amply sustains this statement. A careful study of the acute drop in the prices thus noted, apart from the continual local fluctuations, shows us that not only are the freight rates much lower than ours, but that in the mechanical handling of the raw materials the Americans are far ahead of any one else. English opinions to the effect that ores and fuel could not be brought to the seaboard sufficiently cheap to leave any margin for export, have proven to be erroneous.

We must now look at the means by which we can combat this American export movement. First in order is the necessity of cheapening our cost of production, and then a general lowering of our excessive freight rates. We would have the consolation of being able to hold our own; but unfortunately we must count with our government railway monopoly. We all recognize the necessity for cheaper rates and water transportation, but in spite of all our efforts the results so far have been quite meagre. Without liberal reductions in freight rates, the German iron industry will not long be in position to hold its export trade, to say nothing of extending it. The heavy reductions in wages in America have also much to do with the reduced cost in production there. The recent long period of retrogression has brought with it tremendous conflicts between capital and labor, always ending with the submission of the latter. Even now the great coal strike is not fully settled. Uncontroverted utterances made in the British Parliament regarding the wages paid in America show that the proverbial high wages paid to the workingmen may now be considered as mythical, and that American workingmen are far worse off than the German, as they do not have steady employment, are continually subject to discharge without notice, and do not know the benefits of insurance in case of sickness, accident and old age. It may be added here as a matter of information that from 1883 up to 1895 there has been paid in Germany for insurance in case of sickness, 190 millions of dollars; for accident insurance, 50 millions, and for old age and permanent disability pensions 25 millions of dollars. These blessings American workingmen are totally ignorant of. In sharp contrast to the brutal indifference to the workingmen and office force prevalent in the United States, we have for our main object here an assured continuance of work, be the times what they may; and many a sacrifice has been made so that the working force might be held together. Periodical shut downs, which are common in America, are fortunately unknown here, and a healthy, happy relation exists between the workingman and his employer. This very point of giving uniform and continuous work to the men has been the means of establishing our export trade; and thanks to the excellence of our products we hold our own in spite of the more favorably situated countries of Belgium and England. Yet it must be said that much of the material which we export not only does not yield any profit, but is an actual loss to us. However, even thus it is of the highest value in keeping our industrial classes employed. I will close with the fervent wish that in spite of the lowering clouds of American competition, we may still be able to give our men employment and secure our share of the world's markets.

In the discussion which followed the address of Mr. Schroedter, American irons were further commented upon, and the trend of thought may be of interest to blast furnace men here. Privy Councillor Juengst stated that American pig irons were sold without a guarantee regarding their composition. He had bought them in order to find out what they really were, and to combat the continuing upward tendency of pig iron prices in Germany. The American irons in question were equal in price to the German, and had the same chemical composition, and were used for all possible purposes with the best results. Mr. Schroedter replied that while this was undoubtedly true, and had been repeatedly tried to his own knowledge, still American foundry pig iron was so variable in quality that a strict watch would have to be kept. As an instance he quoted the example of the Tennessee Coal & Iron Co. He had read in an American trade journal that owing to the hard times this company had discharged its whole laboratory force to save expense. Analyses were no longer made, and the furnaces were blown as you please.

General Manager Meier spoke in substance as follows: The former high wages in America have compelled the producers to make betterments on a vast scale so that the output is very heavy for a given labor charge. The excellent devices for handling ore are being adopted in Germany, though on a much smaller scale. We suffer from a want of waterways which allow the use of such conveyors. The trouble with us Germans is that we fear the heavy expenses of canals, etc., as we do not know how long we may be able to keep the wheels turning. Cheap freight is to us the keynote of the whole situation. The American privately owned railway lines do not have to provide funds for running the government, and they value the prosperity of the industries they draw their revenue from more highly than we do our own. While the coal industry is still in good shape, the iron trade is in bad straits. The freight question with us is so serious that movement by rail as carried out in America is entirely out of the question. In Upper Silesia we have similar conditions to those in the Southern United States. If our ores were as rich as theirs, and our coke as good, we would have a prosperous iron industry also, but as it is we must import ore from Sweden, Austro-Hungary and Lapland, taking advantage of cheap water transportation. Nothing will help us but lower freights. Again our railways cars are too small, 15 tons being the capacity of the greatest of them. In America they are said to run up to 50. Then, also, we cannot obtain any cars which open at the bottom. We are told that such cars are poor structurally and do not fit well with our railroad standards. and we must therefore do without them here.

The question of wages was also discussed, the statement being repeated that all wages have suffered in the United States, though it was observed that skilled labor still commands good prices when compared with the ordinary.

In connection with the above discussion it is of interest to note that Dr. Wuest in *Stahl und Eisen* of Dec. 1 states that he also has had considerable experience with American irons, and has not always had uniformly good results. Dr. Wuest deprecates the use of these irons as not calculated to produce castings in quantity economically. He ascribes it to high phosphorus and low manganese, a point on which few American foundrymen will agree with him. In justice to the Doctor, however, it may be that the sulphur conditions of German and American irons differ widely. We out here are averse to filling our castings with spots of manganese sulphide to spoil our tools for us in machining them.

It is definitely settled that President McKinley will attend the banquet of the National Association of Manufacturers to be given at the Waldorf-Astoria, Thursday night, Jan. 27. A committee consisting of Warner Miller, Charles A. Moore, Charles A. Schieren, William Brookfield, Benjamin Atha, Henry B. Haigh, and Charles E. Locke, by appointment called at the White House to extend the invitation. After taking a day to consider the matter the President accepted the invitation and assured the committee that he not only felt it to be a duty, but that it would be a great pleasure to him to meet with manufacturers representing all lines of industry and from all sections of the Union, at their annual convention. It is understood that Senator Frye also has consented to speak. The committee hopes to be able to make a full report to the convention executive committee as to the names of other speakers within a few days.

The Brightman Furnace Co., of Cleveland, O., is building Brightman stokers for six Geary water tube boilers for the Division Street pumping station of the Cleveland Water Works, in addition to having equipped nine horizontal tubular boilers at the same station. The company also will install apparatus for automatic removal of the ashes and refuse from the boiler room. Beside filling the second order from the Mill Creek Distilling Co., Cincinnati, the Brightman Furnace Co. is erecting several for foreign shipment. Among the latter is an exceptionally large one for Levie Bros., Brussels, Belgium. The company predicts a prosperous season in its stoker business.

A STUDY OF BOILER TYPES.*

BY J. P. JOHNSTON.

The subject is perhaps second in importance to none among scientific questions. The results made possible by the proper application of heat to water to produce steam in a usable way are boundless. Probably no one combination of Nature's elements in so useful a form as steam has done more to civilize the world and give us the comfort, convenience and luxury of the present time. All honor to Hero, Porta, Worcester, Papin, Newcomen, Smeaton, Watt, Evans, Barlow, Fulton, Stevens, Stevenson, Corliss, Wilcox and the hosts of others, whose earnest study, brilliant invention and unremitting labors have produced the high pressure, multiple expansion, condensing engines and high pressure safety boilers of to-day.

It is not my intention to enter into a technical discussion of the subject. Abler writers have contributed so extensively on the question, it would be presumptuous in me to attempt it. Nor do I propose to give a history of steam, its production and application. Those interested can readily and more satisfactorily consult the literature on steam. But I shall endeavor briefly to call attention to a few points that I trust will be of practical benefit. For this purpose I shall divide the subject into five divisions, namely: 1. Types of Boilers. 2. Selection of Boilers. 3. Specifications for Boilers. 4. Uses and Abuses. 5. Possibilities.

Several subdivisions are possible but the following will best serve the object of this paper: (*a*). Plain cylinder. (*b*). Flue. (*c*). Fire tube. (*d*). Water tube. Naturally the earlier forms of boilers were very simple in design and construction and as some of them are only of historical value will not be considered.

(*a*). Cylinder boilers. Simple in construction, a cylinder with two heads, grate under one end and the gases passing backward underneath to a stack at the rear, and much used until the demands for higher pressure, increased capacity in a limited space, and greater fuel economy required something better. The sheets were punched and rolled to no exact diameter and the heads flanged by hand to fit. Strange to say, in certain sections of the country the cylinder boiler is still in use, regardless of the danger from explosion and the almost criminal waste of fuel. In this connection a test made by Mr. Jay M. Whitham, of Philadelphia, on a water tube boiler place to receive the waste heat from cylinder boilers, is interesting. It was found that the water tube boiler thus used increased the evaporative capacity of the plant 85 per cent without any increased quantity of fuel. Cylinder boilers were built to most wonderful lengths. For example, a cylinder boiler for a certain blast furnace was 42 inches diameter and 80 feet long. It is not surprising that the owner did not get as much steam as he expected from the additional heating surface, thus provided. The cylinder boiler was highly esteemed in its day. Witness one writer who says: "Cylinder boilers are the simplest, cheapest, safest and best boilers that can be made." But happily for the profit side of the account and for the safety of the neighboring population they are fast going out of use.

(*b*). Flue boilers. The desire for increased capacity and economy resulted in the placing of a small cylinder or flue inside the cylinder boiler, and the gases were carried under the boiler and backward through the smaller cylinder to the stack, placed in front of the boiler. A flue boiler with one flue is known as a "Cornish," with two flues as "Lancashire," or, in this country generally as a two-flue boiler; and with more than two flues, as return flue or multi-flue boilers. The single flue boilers are not commonly used in this country. The two-flue and multi-flue boilers have been almost displaced by the horizontal return tubular and the water tube boilers, to be described later, except in a few special cases. In these special cases, notably blast furnaces and steamboats of shallow draft, such as the Ohio and Mississippi river boats, they are still used to a considerable extent although the water tube boiler, especially the vertical type, is fast displacing them for blast furnaces. On the shallow draft boats the small amount of head room and short stacks required have caused them to retain their place, notwithstanding the fact that every once in a while we hear of a boiler exploding with very disastrous results. These explosions are probably due to crowding the boilers and loaded safety valves but as those in charge seldom live to tell the tale no satisfactory investigation is possible. There seems to me quite a field in this connection for the inventive genius of the boiler man.

(*c*). Fire tube boilers. A still further necessity to raise the pressure, reduce the space required for the same capacities and to gain rapidity in steaming, resulted in the fire tube or tubular boiler, much in use at the present time and claimed by some as the standard boiler of this country. This subdivision might again be divided into fire-box, flue tubular and return tubular. Of the fire-box the locomotive and marine fire-box are the most familiar examples. In this form fuel economy is sacrificed to some extent to accommodate it to the special conditions of its use. The flue tubular or "Scotch" boiler has many friends, especially in marine practice, and is a very economical boiler. In the return tubular the gases are passed under the boiler and back through the tubes, conducing to greater economy and more rapid steaming.

Of course there are many variations of the above, conforming to special conditions and to the ideas of the various engineers and builders, but in a general and brief manner I have endeavored to present the different forms and the reasons therefor.

(*d*). None of the above are safety boilers, and the desire to prevent the many disastrous explosions led to the development of the water tube boiler, first invented by Blakey in 1766, although some claim by Barlow in 1793. Little attention was paid to water tube boilers until late in the fifties when J. B. Root and Stephen Wilcox began their experiments, which have resulted in the forms of boilers in use to-day, that are fast displacing the old forms. There are many advantages in the water tube boiler, not the least of which, perhaps, is safety from disastrous explosion. In this connection it is interesting to know that the Hartford Steam Boiler Inspection & Insurance Co. reports for 1896 346 boiler explosions in which 382 people were killed, 529 injured and in four cases the property damage amounted to nearly $400,000. Had water tube boilers been used, these disastrous explosions would not have been possible. Other advantages are economy in fuel, due to smaller divisions of water, thinner heating surfaces, high pressures and the distribution of the heating surfaces in the most advantageous manner; better facilities for cleaning and repair; durability, positive and rapid circulation, maintaining the same temperature in all parts of the boiler, thus preventing undue strains; rapidity of steaming, dry steam, greater capacity in the same space, etc.

There are many different types all of which are claimed by their makers to have certain advantages over those of other makers. The standard types of stationary boilers can be all summed up in two classes, those having horizontally inclined tubes, of which the Babcock & Wilcox is probably the leading type, and those having vertical tubes, of which the Cahall is probably the leading type. There is practically little difference in the fuel economy of any of the water tube boilers, the difference in value being chiefly in the cost of maintenance and repair.

I have purposely omitted saying anything on marine boilers, as my experience has been almost wholly with land boilers; but it would seem that the water tube boiler was destined to play an important part in future marine practice, for, aside from the advantages claimed above, the less weight, and the ability to stand almost any amount of forcing without damage to the boiler, are certainly qualifications that commend themselves to the shrewd engineer and purchaser.

2. Selection of Boilers. A steam user needing power should study his requirements and purchase the boiler that seems best adapted to his requirements, both for the present and the future. If he does not feel capable to decide the question himself there are plenty of good engineers whom he can call to his service and almost every boiler agent is willing to donate his services. With regard to the latter I must say, however, that few are able to give an unbiased opinion. The conditions are so varying that it is impossible to give an inflexible rule; but on general principles it is safe to say the best is not too good and the cheapest in first cost is often the most expensive in the end.

3. Specifications. Under this division I shall not attempt to give a detailed specification further than to say there are

*Read at the December meeting of the Civil Engineers' Club of Cleveland.

certain requirements that must be filled if the best results are expected. These requirements were probably best stated by the late Mr. Geo. H. Babcock and are as follows:

1. The best materials sanctioned by use, simple in construction, perfect in workmanship, durable in use, and not liable to require early repairs.

2. A mud drum to receive all impurities deposited from the water, in a place removed from the action of the fire.

3. A steam and water capacity sufficient to prevent any fluctuation in pressure or water level.

4. A large water surface for the disengagement of the steam from the water in order to prevent foaming.

5. A constant and thorough circulation of water throughout the boiler, so as to maintain all parts at one temperature.

6. The water space divided into sections, so arranged that should any section give out, no general explosion can occur, and the destructive effects will be confined to the simple escape of the contents; with large and free passages between the different sections to equalize the water line and pressure in all.

7. A great excess of strength over any legitimate strain; so constructed as not to be liable to be strained by unequal expansion, and, if possible, no joints exposed to the direct action of the fire.

8. A combustion chamber, so arranged that the combustion of gases commenced in the furnace may be completed before the escape to the chimney.

9. The heating surface as nearly as possible at right angles to the currents of heated gases, and so as to break up the currents and extract the entire available heat therefrom.

10. All parts readily accessible for cleaning and repairs. This is a point of the greatest importance as regards safety and economy.

11. Proportioned for the work to be done, and capable of working to its full rated capacity with the highest economy.

12. The very best gauges, safety valves and other fixtures.

Detailed specifications are desirable if drawn up by a man who understands his business, but a person who has not made a study of boilers would better let specifications alone. If a buyer is competent to judge a boiler or boiler specifications, it is hardly necessary to do more than state the size of boiler required, that is, the horse power at centennial rating, or to give the total amount of water per hour to be evaporated at rated capacity of the boiler, and with what economy, and if the boiler is expected to run above rated capacity at times, to so state, and how much. Of course public advertisements require specifications, in which case they should be drawn up by a competent expert. A purchaser who does not feel competent to decide which is the best boiler and which the best specifications submitted by the different bidders (for all boiler companies will submit detailed specifications if requested), would do well to employ an engineer to decide for him; or, if he knows which type of boiler he wants, have specifications drawn up for him to submit to the various bidders.

4 Uses and Abuses. Many users of boilers never give a boiler the least thought after it is installed, until an insufficient steam supply, increased fuel bill, or an accident calls their attention to it. They are perhaps most careful to see that the office is kept clean and orderly and will allow the boiler to run day in and day out month after month, without anything but the most superficial inspection and cleaning.

It is just as important to keep a boiler in good condition as any other piece of machinery, or your own digestive organs, if the best results are to be obtained. The Hartford and other insurance companies of the same kind have done much by their careful inspection to correct the all too common abuses of boilers. Many users of boilers think any kind of a man is good enough for a fireman, but a careful, thoughtful fireman will more than save enough to pay the difference between him and a careless man. It is a pleasure to find a concern that keeps a systematic record of the kind and quantity of fuel used and cost of repairs, and it is surprising what those records show sometimes. The difference between a careful and a careless fireman then becomes apparent.

The selection of good feed water, or the purification of impure feed water before it gets into the boiler is another source of saving.

The boiler capacity of a plant should be kept up to the steam requirements instead of continuously running the boilers away above their rated capacity, which not only is hard on the boilers, as proper cleaning is then impossible, but is also wasteful in fuel and consequently expensive.

Many other features might profitably be discussed—feed water heaters, feed water regulators, economizers, smokeless furnaces, automatic stokers, proper fuels, etc., but they would make this paper too long. I hope what I have said will be in a small way beneficial and that the many able members present will discuss the question to our mutual advantage.

Cleveland territory has long been considered backward in the adoption of improved methods of making steam, and a careful study and the adoption of the best present practice by Cleveland manufacturers, will result in added profits, increased wealth and commercial supremacy. Just a few words more in closing on

5. Possibilities in the future. It is not generally believed that much greater economy in power production can be expected from steam than we get from our best engines and boilers. The increase in pressures used, from 5 to 8 pounds above atmospheric pressure, 100 years ago, to 250 to 350 pounds in use to-day, and the improved engines and boilers have resulted in great saving. Yet the steam turbine and such boilers as that recently designed by De Laval to carry 3,000 pounds pressure may result in securing in small or medium sized units a horse-power with from 9 to 10 pounds of steam, beyond which we can hardly expect to go.

But I confidently predict that within the next generation we will see wonderful strides in the production of power more direct from heat than our present methods. Whether it will be in the direct utilization of the sun's heat, or the harnessing of the beautiful aurora I know not; but the combined efforts of the great men of the present are bound to result in surprises even to the daring Tesla.

Gas Engines for Pumping Oil Wells.

A Bolivar, N. Y., letter reviews the year's experience with gas engines in the oil country, and says that it has been so satisfactory that the substitution of gas engines for steam engines for pumping wells promises now to do on rapidly. In all of the oil fields that compose the 400-mile stretch from Nile, N. Y., to West Union, W. Va., the gas pressure has been steadily weakening, and on hundreds of leases it has been necessary to buy wood or coal for fuel, or to burn crude oil, all three expensive fuel and requiring more labor than when gas is used. For instance, in Allegheny County, there are 4,000 wells producing an average of half a barrel each day. It is believed two-thirds of the leases do not produce natural gas enough to supply the boilers with fuel. The yield of the wells is so small that the strictest economy must be observed, and the question of fuel is an important one, for it makes a big showing when the profits are computed. And the same condition prevails in nearly every part of the Pennsylvania fields.

The amount of gas consumed by a gas engine varies from 11 to 15 feet an hour for each horse power, making the cost for a 10-hour run for a 10 h. p. engine from 11 to 15 cents at 10 cents for each 1,000 feet, or from 22 to 30 cents at 20 cents for each 1,000 feet, the price varying between the figures named in different places. As it usually requires from one to three hours to pump off a string of old wells, it will be seen that the expense for fuel is next to nothing. During the last year over 300 gas engines have been placed on oil leases and are doing satisfactory work. The engines vary from 10 to 50 h. p., and cost about the same as a boiler and engine of equal power. In the year 20 of the Standard Oil Co.'s pipe-line pumping stations have been equipped with gas engines.

A SPECIAL meeting of the Civil Engineer's Club of Cleveland, was held in Case Library, Dec. 28. The paper of the evening on "Construction of Ships for Service on the Great Lakes," was read by Richard L. Newman. It was illustrated by numerous drawings and charts, and treated of the methods by which modern ships are given greater strength in cross-section without increasing the weight or depth, thus permitting the design of vessels of much greater length and tonnage than were thought possible a few years ago. The proper location of the machinery as affecting the strength of the hull was considered.

25 YEARS OF VALUABLE SERVICE.

In *The Iron Trade Review* of Jan. 3, 1895, appeared an appreciative sketch of the 22 years of Mr. James M. Swank's service as general manager of the American Iron and Steel Association. It was written by Dr. Wm. M. Sweet, who had opportunity of knowing of the value of Mr. Swank's work to the great interests he represented. In the current issue of the *Bulletin* Mr. Swank makes the following reference to the completion of a round quarter of a century in his position:

"Friday, Dec. 31, 1897, marks the close of 25 years of active and continuous service by the undersigned in the office of the American Iron and Steel Association. Of the nature of the service we have rendered to the American iron trade in this long period, with the help of intelligent and faithful clerks, we will not speak in detail, although many words would be justified for the reason that nearly all the men who were active in the manufacture of iron and steel in this country a quarter of a century ago have passed away and their places have been taken by younger men who are not, as a rule, familiar with the work of the association, especially with its tariff work in the old days when foreign competition year after year threatened all further growth of our iron and steel industries. There were many anxious days in this office from 1872 to 1888, when bill after bill was introduced in Congress to reduce duties on iron and steel and on other foreign products.

"Recalling for a moment the tariff work of the association since 1872 we doubt whether many even of our oldest members realize how many millions of tariff tracts have been mailed from our office during the period under consideration. These tracts have represented several hundred distinct compilations of tariff facts and arguments, all made by our own hands or carefully supervised by us. On a shelf in our office are several large volumes composed of single copies of each of these tracts. They were distributed where they were most needed in the days when protection to home industry was not so popular a doctrine as it now is. Of the other tariff work of the Association in these 25 years, including special pleas on special occasions, much might be said that will forever remain unwritten.

"Next to the tariff work that has been done by this association in the last 25 years—work that will never need to be done again—we might dwell at length upon the fact that when we came into this office the iron trade of this country possessed no directory to its iron and steel works or to the principal consumers of the products of these works, nor was the trade supplied with accurate and comprehensive statistics of the production of iron and steel from year to year. In these 25 years the biennial Directory of the association and its Annual Statistical Report have regularly and unfailingly supplied the American iron trade and all the industrial world with the exact information upon the lines mentioned that was so greatly needed. Thirteen editions of the Directory and 25 Statistical Reports have been published in these 25 years. Our last Directory was the most complete we ever published, and our last Statistical Report contains a statistical review of every branch of the American iron trade for a long series of years, making a statistical reference book that will become more and more valuable from year to year. We have recently perfected arrangements for the more prompt interchange of our own statistics with those of foreign countries, the good results of which should be observable in the publications of theassociation in coming years.

"In addition to the routine correspondence of our office that has been necessary in the collection of information for our various publications a vast amount of miscellaneous correspondence has been disposed of in the last 25 years. Thousands of letters of inquiry from all parts of our country and from many foreign countries have been received and answered, many of them entailing a great deal of labor. Most of these letters have requested statistical information to meet the special wants of manufacturers, tariff advocates, newspaper editors, members of Congress, and others, while the remainder have related to the thousand and one subjects which are assumed to come within the scope of a bureau of general information such as the American Iron and Steel Association is supposed to maintain.

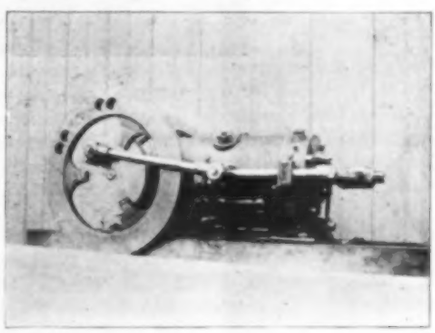
"When we entered this office there was not in existence any history of the American iron industry to which we might turn for information concerning the work of the pioneers in that industry, or which would tell us when and under what circumstances we began to make pig iron with anthracite coal, or with bituminous coal, or with coke, or which would give the history of the manufacture of iron rails in our country. A more immediate historical need was exact information relating to the introduction into our country of the manufacture of crucible, Bessemer and open-hearth steel and the manufacture of Bessemer steel rails; yet no such information in compact and authoritative form was in existence. We have supplied all this lack of historical information. The first edition of our "Iron in All Ages" appeared in 1884 and a second edition appeared in 1891. We may also mention that 25 years ago the library of the association embraced just three books in addition to its own publication; now it embraces a large collection of technical and tariff publications, books of reference, etc., which may be freely consulted by all iron and steel manufacturers.

"The *Bulletin* of the American Iron and Steel Association was established at an early day in the history of the association, the first number having been issued on Set. 12, 1896. It has been from first to last an eight-page paper. Not having been established for the purpose of making money through advertisements and subscriptions its dimensions have been purposely restricted. It has been published chiefly to advocate the protective policy and to give to American iron and steel manufacturers such statistical and other information as they would not find elsewhere. In late years, because of the increasing attention required by our Directory, Annual Statistical Report, and tariff publications, the *Bulletin*, which had previously been published every week, has been published three times a month."

In the concluding portion of his editorial, Mr. Swank refers to the suggestion he made in his annual report for 1880, that the *Bulletin* be published in magazine form. No action was taken on the matter however. But now, in view of the fact that the battle for protection has been fought and won, at least for the rest of the century, it is announced that the *Bulletin* will be made a semi-monthly publication, instead of trimonthly, appearing on the 1st and 15th of each month.

THE CHASE GAS MOTOR.

A gas engine calculated especially for use on motor vehicles has been designed and patented by John Q. Chase, of Dayton, O. A view is given in the accompanying illustra-



tion. The engine is 8x24 inches over all and will weigh 200 lbs. It developes 4 h. p. at a speed of 450 revolutions a minute. The cylinder is 5¼x12 inches, inside, and 8x16 inches inside measurement; the straps 6 inches; the wheels 14 inches diameter and 1½ inch face. The engine is double acting, an actuating force being applied at either end of the piston. By the system of connecting employed, the rods being carried along the side of the cylinder, space is economized. In the construction of the piston, and cylinder, the aim is to do away with a large part of the heat developed on explosive engines. There is a circulation of cold air through the center of the piston and at the same time the cylinder is cleaned of any unburnt gas before a fresh explosive mixture is taken on.

The engine is of the throttling type, taking on heavy or light charges according to the work it has to do, thus securing a uniform speed with a power producing impulse at every

revolution of the wheels. A specially constructed sleeve is provided for the piston rod, no packing being required to prevent leakage. The gasoline or gas is taken in at a central point from both ends of the cylinder and is carried into the compression chambers through the air valves at either end, these being in direct and sensitive control of the governor. The exhaust is through auxiliary and end ports at the center of the cylinder, the ports being controlled by poppet valves operated by cams fastened to a lay shaft which is spirally geared.

There will be but one cylinder head, and that entirely free from pipe connections, all necessary pipes being connected to the body of the cylinder. The gasoline is fed through a needle valve into the side of the cylinder and is here mixed with the proper proportion of air and passes direct into the compression and explosion chambers. The engine is equipped with tube and electric igniters.

Drawings have been prepared for a larger sized engine of the compound type, with direct forward connections and doing away with the parallel side rods. This is designed for industrial use and would cost practically the same to build, taking up practically the same floor space, yet developing double power. The application of the small motor to vehicles has been carefully studied by the inventor. The elimination of shafts and pulleys, and at the same time the attainment of varying speeds, is believed to adapt it to this service.

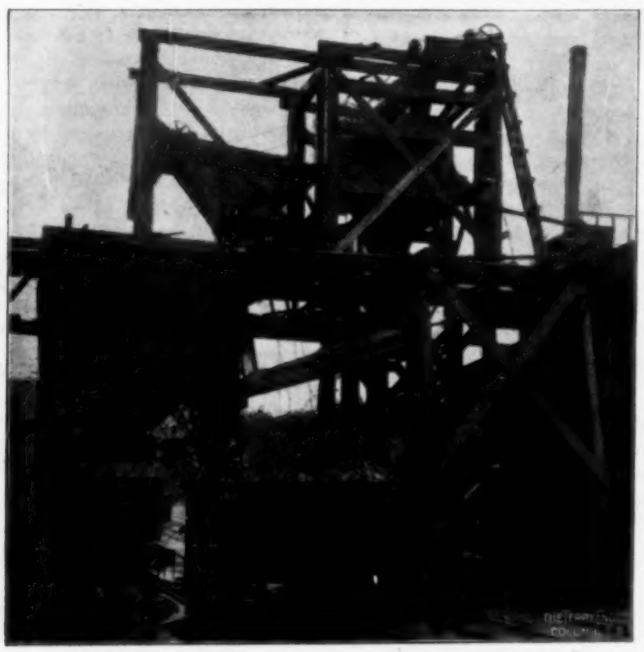
THE Wellman-Seaver Engineering Co., of Cleveland, has contracts for two important pieces of crane construction. One is for the American Steel Barge Co.'s yard at West Superior, Wis. It is a double crane, 170 feet over all, commanding a boat on either side. Westinghouse electric motors—the alternating system—are employed. This crane is now nearly completed. The other, for which detailed plans have been made, and some of the construction work let, is for the Union dry dock of the Erie Railway at Buffalo. It is a cantilever electric crane with a single overhang, the span being 170 feet. It will be operated by the Niagara current, and as in the case of the West Superior crane, the Westinghouse Electric & Mfg. Co.'s alternating system will be used in the motor equipment.

THE Kilmer Bale Tie Co., of Joliet, Ill., will remove its manufacturing plant to Chicago Plains, a suburb of Chicago, a mile west of the Desplaines River, at the crossing of the Northwestern and Wisconsin Central railroads. The company will occupy brick buildings, in course of erection at a cost of $25,000. The name of the firm will be changed to the Kilmer Wire Mfg. Co.

CHICKAMAUGA COAL WASHING PLANT.

The accompanying cut is an illustration of the washing plant of the Chickamauga Coal & Coke Co., Chickamauga, Ga. It was designed and installed by the Jeffrey Mfg. Co., of Columbus, O., and consists of the following machinery: One 400-ton Robinson coal washer complete with fixtures, including special drainage screen; one 35 h. p. engine; one 80 h. p. boiler; one coal crusher or disintegrator; one complete set of screens with end dump weigh box, together with complete elevating and conveying system for handling the coal to and from the washer.

The coal is brought to the washer in ordinary dump cars and is discharged upon the lump screen, the large coal passing into the car for shipment, while all of the screenings pass into a storage hopper from which they are taken by means of a screw conveyor to the coal crusher. All of the coal at this plant is crushed before washing. The coal after being crushed is taken from the disintegrator by means of a chain bucket elevator direct up into the washer. The washed coal passes off at the overflow and after being freed from the water is discharged into a hopper from which it passes into railroad cars. The refuse by means of a chute is carried to one side and is discharged into the gob pile. The entire plant was designed for a minimum capacity of 40 tons per hour. Its arrangement is very compact and but one man is required to operate it.



CHICKAMAUGA COAL WASHING PLANT.

THE papers for the Jan. 5 meeting of the Foundrymen's Association were on "Annealing of Malleable Cast Iron," by Geo. C. Davis, and on "Improved Pneumatic Tools for Foundry Use," by Mr. Robbins, of the Clement Pneumatic Tool Co.

THE Safety Conduit Co., which was recently organized at Rankin, Pa., by Braddock capital to make a patent acid-proof coating for pipes is about ready to begin operations. The company some time ago invented and patented a process for the lorication of pipes. The pipes are dipped into large vats, which contain a preparation of paint and other mixtures. They are then to be taken out by cranes and swung into heating furnaces, where they will be baked. The company has made trials of its process, and the pipes have withstood all known acid tests. The lorication is of special value for insulated iron and steel pipes, soil pipes, and other sanitary fittings. The pipes thus treated will not corrode by any earthy or atmospheric action upon them. The Garland Chain Co., of Rankin, is interested in the new enterprise.

A SPARE BOILER.

How many plants, electric light or power plants, are there that would like to have, if they only could, a spare or extra boiler? Boilers enough when the plant was first erected to easily do the work, though like other good live concerns, they grew—more light and more power needed. But the boilers did not grow, and the harder they were driven, the lower the temperature of the feed water delivered to them. The crying need of these establishments is an extra boiler—not only as a reserve, so that repairs and cleanings can be made to the others—not only to give the extra steam required at those times during the day when the full load goes on—but to save some of that coal which is wasted in forcing that last 50 or 100 H. P. from those boilers. Here is the solution which is applicable to nine out of every ten plants. Feed hot water to your boilers—not water at 150°, 160° or 180°—but water at the temperature of exhaust steam,—and make this water pure, so that it will not leave a c ating of impurities on the heating surface of your boilers. This can be done with a "Cochrane" Heater.

A CASE IN POINT—Not long ago, a prominent electric light plant presented a problem of this sort to us. The limit of the capacity of their eight boilers with the heaviest load on, feeding water through their comparatively new closed heater, was about 1,000 H. P.

THE SOLUTION—We simply put in for them a "Cochrane Heater and Purifier," which gave them feed water at 210° (and the harder they drove the boilers the hotter it got.) Old scale came down by the barrel load—the pure water of condensation had loosened it.

THE RESULT—They have carried and can now regularly carry, whenever desired, 1,200 H. P., and the normal load which formerly required every one of their eight boilers, is now easily done with seven boilers. Moreover, we guaranteed them a saving of thirty tons of coal per month. They tell us they are saving from forty to fifty tons.

Do you want or actually need the equivalent of a spare boiler? Then write us or any of our agents about the "Cochrane" Heaters.

HARRISON SAFETY BOILER WORKS,

PHILADELPHIA, PA.

COCHRANE HEATERS

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Frank Krein Mfg. Co. has been incorporated at Marion, Ind., with a capital stock of $100,000, to manufacture chains and other articles, by Franz, R. C., Frank and Amy Krein and L. E. Lambert.

W. D. Castle & Co., Gridley, Ill., are in the market for a 20 h. p. gasoline engine, a 30 h. p. steam engine, elevator buckets, shafting and pulleys.

The Crescent Drop Forge Co. has been incorporated at Chicago with a capital stock of $5,000, by Edward and Ferdinand Barnickol and Edward Sendelbock.

The Allen & Morrison Brake Shoe Co., capital $50,000, has been incorporated at Chicago, for the manufacture of brake shoes, by Jonas A. Miller, A. J. Allen and James F. Morrison.

The Crafts Machine & Tool Co. has been incorporated at Buffalo, with capital $30,000. The incorporators are R. K. Noye, president; Frank H. Crafts, vice-president; Henry Koons, secretary and treasurer; Edward Michael and James A. Roberts.

The Birmingham (Ala.) Paint & Roofing Co., W. H. Rodgers, president, asks estimates on complete equipment for iron-roofing works.

Latchford & Brown, Hearne, Tex., want an engine lathe, 26 x 30 swing, 10 to 12 feet between centers, second-hand, and a planer, 6 to 8-foot bed, second-hand.

New Construction:—

It is reported that the Western Iron & Steel Co. is to build a plant at Wyandotte, Mich. A bonus is asked of the town of $25,000.

The Riverside Worsted Mill, of Providence, R. I., is making some extensive improvements. The boiler house is being rebuilt so as to have it absolutely fireproof. The walls are of brick, and the roof will have metal supports with a tile roofing. Contract for furnishing and erecting the iron work has been given to the Berlin Iron Bridge Co., of East Berlin, Conn.

The Shultz Bridge & Iron Co., of McKee's Rocks, Pa., is building 33 overhead signal spans and a number of steel towers for the Pennsylvania Railroad. It is stated that hereafter only steel signal towers will be erected.

The Ohio Cultivator Co. will build an addition to its factory at Bellevue, O., to cost $12,000. It will be a duplicate of the present building.

The location of the great plant of the American Axe & Tool Co. lies between Charleroi, the well-known glass town, on the Monongahela River, and Avonmore, on the Kiskiminetas. The Charleroi bonus, under the original offer, was $50,000. Avonmore is understood to have offered $1,000. It is the expectation of the tool company to have its plant running by July 1.

The Huber Mfg. Co., Harrisburg, has broken ground for the erection of a warehouse and small machine shop.

The Cincinnati, Hamilton & Dayton Railroad is building new shops at Lima, O., which are to be fitted up with late and improved machinery.

The Bullock Electric Mfg. Co., of Cincinnati, contemplates an enlargement of the plant in the near future. Plans have not yet been made, but it is probable that one or two single-floor buildings, about 100 x 200 feet, will be erected The power plant will have a capacity of about 1,000 h. p.

At Sheffield, Ala., the construction of the Sheffield Rolling Mill (Hemphill & Johnson, owners) is proceeding rapidly. The puddling-mill building, 60 x 243 feet, and finishing mill building, 80 x 100 feet, are nearing completion and will soon be ready for the machinery. The plant will probably be in operation by April 1, employing 100 skilled workmen and 200 others, producing bar and angle iron, T-rails, spikes and cotton ties.

Additions, Enlargements, Removals, Etc.:—

The present enormous output of steam pumps at the works

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

GOVERNMENT ‡ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Alleganv County, Md.

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Ferguson Block, Pittsburgh, Pa., Stowe, Fuller & Co., 195 Merwin St., Cleveland, Ohio.

SEMI-STEEL Machinery Castings of All Kinds.

Cylinders, Rolls, Dies, Etc.

Castings Furnished Within Two Days After Receiving Patterns.

40,000 LBS. TENSILE STRENGTH. GIVE US A TRIAL.

SEMI-STEEL CO., KING & ANDREWS CO., Proprietors, Chicago.

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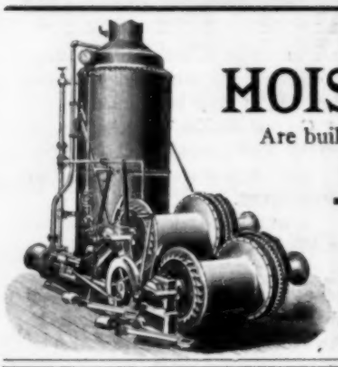
"OTIS" FIRE-BOX PLATES A SPECIALTY.

Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

Head Office and Works, CLEVELAND, OHIO.

Agencies: NEW YORK, 97 Cedar St. CHICAGO, Old Colony Bldg.
ST. LOUIS, 516 N. Third St. WASHINGTON, Kellogg Bldg.
MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.



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Are built to Gauge on the Duplicate Part System.

QUICK DELIVERY ASSURED.

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FOR BUILDING PURPOSES, PILE DRIVING, EXCAVATING, ETC.

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BAND-SAW Machines, "TO BEAT THE BAND."

Belt Power and Foot Power.

Our Machines have Modern Improvements. Made in three sizes. Circulars and prices on application.

CRESCENT MACHINE CO.
LEETONIA, O.
No. 4 Front Street.

Subscribe for The Iron Trade Review.

of Henry R. Worthington is inadequate to meet properly the requirements of the trade. Enlargements are being made which will enable the company to increase its output over 30 per cent, especially in pumps of 10-inch stroke.

The Atlanta (Ind.) Tin Plate Co.'s mill is being enlarged, and new and improved machinery being put in. In a short time the capacity of the plant will be doubled.

Fires and Accidents:—

The plant of the F. C. Austin Mfg. Co., builder of contractors' and heavy farm machinery, at Carroll ave. and N. Carpenter st, Chicago, was destroyed by fire Dec. 29, with a loss of from $80,000 to $100,000. Insurance amounts to $90,000. The plant occupied a three-story wooden and brick building, 200 feet front, facing on each street.

E. A. Yetter's machine shop, at Marienville, Pa., was destroyed by fire Dec. 21. The fire is supposed to have caught from the boilers. The plant was valued at $10,000; insurance $3,200.

General Industrial Notes:—

The enlargement of the Humbert Tin Plate Co.'s plant at South Connellsville, Pa., from four to six mills is contingent on the closing of some lot transactions, to which residents of Connellsville are pledged. The company now limits to Jan. 10 the time within which its proposition may be complied with by local subscribers.

The Murray Iron Works Co., of Burlington, Ia, has brought suit for $20,000 against R. G. Dun & Co. The petition alleges that the defendants in their bulletin of Dec. 23, 1897, published the following concerning the plaintiff: "Murray Iron Works Co., trust deed, $50,000. Pref. certain creds." The Murray Iron Works Co., with a view to making additions and improvements had decided to issue bonds and to secure them executed a trust deed in the usual way. The petition alleges that the implication of the agency bulletin was that the plaintiff had become insolvent or so embarrassed in its circumstances as to endanger the security of its creditors. "This statement," the petition says, "was entirely false, for the plaintiff was practically free from debt, having no creditors, and with means abundant to fulfill all its engagements."

The firm of Henry R. Worthington contemplates enlargements of its present storage capacity for castings for standard sizes of pumps. There is now carried in storage from two to three months' supply of all standard castings of six-inch stroke pumps and smaller sizes. It is now proposed to extend this system to standard pumps of much larger sizes.

In the new steel mill of the Shenango Valley Steel Co., at New Castle, Pa., now in course of completion, the bloom will be reduced direct to a tin bar of one-eighth of an inch in thickness.

A Sharon, Pa., dispatch says that W. E. Reis, president of the Shenango Valley Steel Co., has purchased $15,000 of the P. L. Kimberly mill bonds. In a short time $25,000 will be expended in repairs. The Sharon mill will resume operations as soon as the repairs are completed. The Greenville mill will start this month.

The new wage scale for the Edgar Thomson Steel Works for the coming year was signed Dec. 31. The wages of only 240 tonnage men are affected in the converting bloom, rail and finishing mills, by the system of readjustment. The wages of the laborers and all day men will remain the same as last year.

A. G. Forbes has been appointed master-mechanic of the Peoria (Ill.) Iron & Steel Works, and at the present time has a force of men overhauling the old machinery, cleaning the buildings, and putting things in running order. Some new machinery will be installed.

Negotiations are in progress for the sale of Rich Patch (Va.) Iron Works, located on the C. & O. Railroad near Covington, Va., to a New York syndicate.

The completed No. 1 furnace of the Crane Iron Works at Catasauqua, Pa., has been lighted, after a thorough overhauling and remodeling.

A. J. Beckley & Co., of Garwood, N. J., manufacturers of perforated sheet metals, have opened an office at 123 Liberty st., Liberty Bldg., New York.

The Westinghouse Electric & Mfg. Co. has declared a quarterly dividend of 1¼ per cent on preferred stock, payable Jan. 3, 1898.

The West Penn Steel Works Co., of Allegheny, Pa., has been reorganized and will hereafter be known as the Jennings Steel Co., Ltd. B. F. Jennings is chairman and treasurer and William N. Howard, secretary.

Three diplomas of merit show in what opinion the judges of the Tennessee Centennial Exposition, recently held at Nashville, hold the Robertson-Thompson indicator, the Lippincott planimeter and Eureka packing. Jas. L. Robertson & Sons, New York, entered these articles and were awarded prizes. Engineers and steam users sending for illustrations and descriptions of these goods will be supplied with interesting literature.

It is again rumored that the plant of the South Sharon Steel Co. will be operated in the spring.

The Dunn Iron & Steel Mfg. Co. of Pittsburg which was incorporated under the laws of Pennsylvania last week is not a new enterprise but the incorporation of the former Dunn Mfg. Co., of Pittsburg. The company manufactures sewer braces.

The Westinghouse Electric & Mfg. Co., of Pittsburg, has taken contracts for installing a 1,500 h. p. electric power plant in Mexico. Power will be supplied to the Anexas Paper Co. for the operation of all grinding machines. Other electrical work is likely to be placed by the same company.

The James Rees & Sons Co., of Pittsburg, has drawn plans and is building engines for three stern wheel wooden steamers which will be built in British Columbia for trade on the Yukon River.

Rolled steel axles are now being delivered on the market by the Keystone Axle Co., of Beaver Falls, Pa.

The Thomas Iron Co., Hokendauqua, Pa., has just completed new stoves for its No. 1 furnace, which went in blast last week.

The Lodge & Shipley Machine Tool Co., Cincinnati, has orders for two 20 and two 16-inch lathes for the Newport News (Va.) Shipbuilding Co. The tools are to be placed upon vessels now in course of construction, and are fitted with special beds, owing to lack of room.

At the annual meeting of the Janesville Machine Co., Janesville, Wis., Dec. 21, the following officers were elected: President, A. P. Lovejoy; vice-president, Hiram Merrill; treasurer, John G. Rexford; secretary, Sam M. Smith; general manager, J. A. Craig.

The Sloss Iron & Steel Co., of Birmingham, Ala., has increased its capital stock from $4,000,000 to $5,000,000 and will

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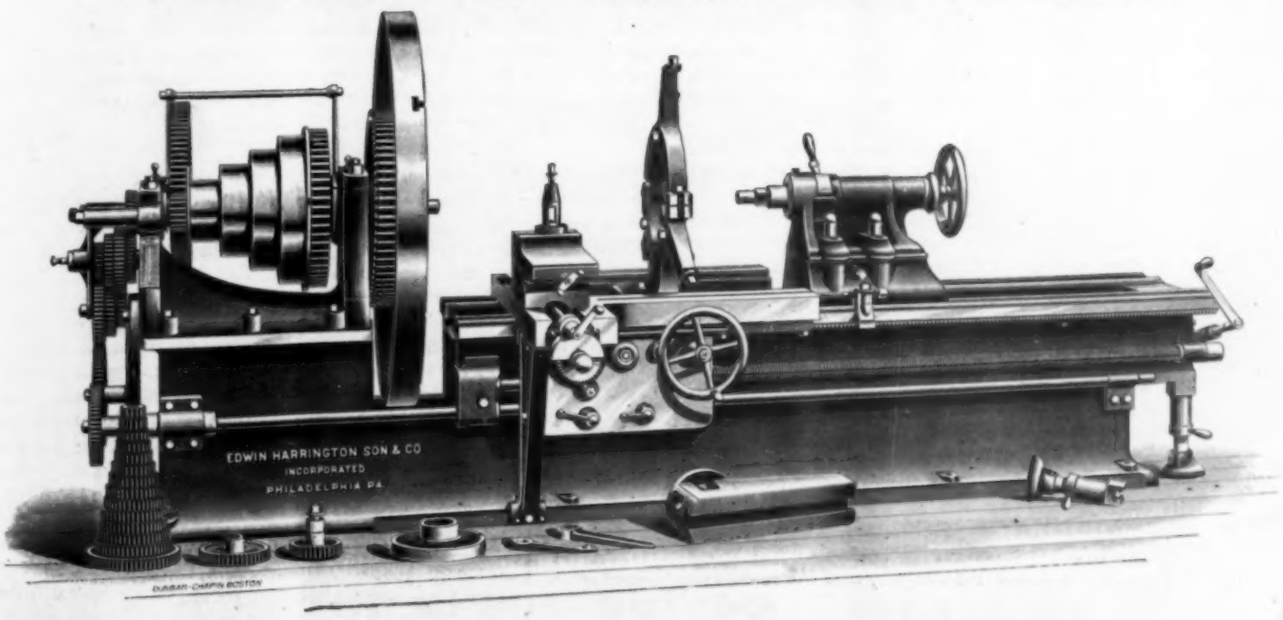

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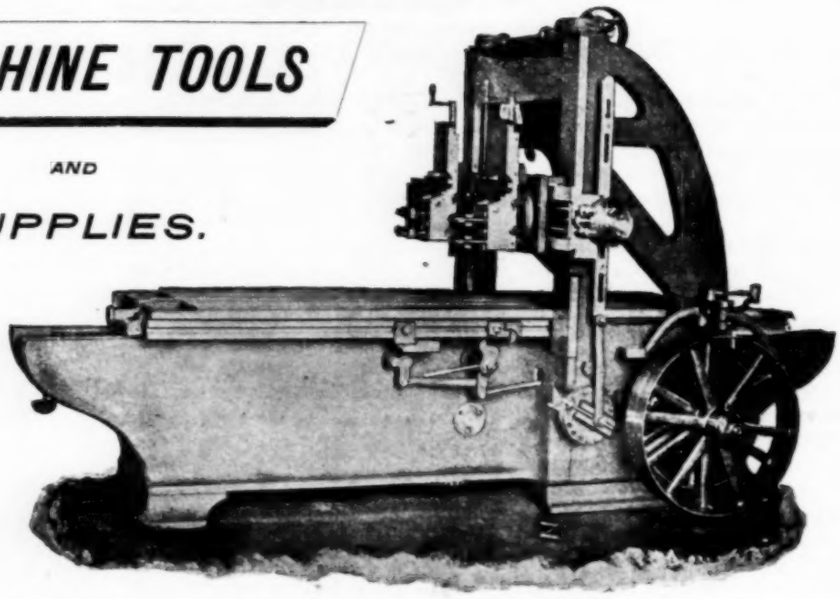

THE ANDREW PATENT GRIP SOCKET.

Holds straight or taper shank drills perfectly rigid. Protects the Shank until the drill is completely worn out. Old taper Shank drills with tangs broken off used just as well as new drills. Beware of infringements.

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expend a large amount in the development of the new iron mines near Leeds.

The Oil Well Supply Co., of Pittsburg is overhauling the equipment and putting in first-class condition its Elba Iron Works and Continental Tube Works, preparatory to starting these plants in February or March. These mills will be equipped to turn out tubular goods of all kinds, casing and pipe from 8 to 12 inches in diameter, in iron and steel.

The Williams & Moore Mfg. Co., of Chicago, lately assigned, has sold out its entire interests to the Q. & C. Co., of Chicago. The rail jack, known as the Williams & Moore, will hereafter be manufactured by the Q. & C. Co., as will also the Williams drill.

All the furnace workers at Bellaire furnaces, Bellaire, O., have received a 10 per cent advance. The No. 2 furnace was started two weeks ago. The steel plant is working double turn with a full force. Some additional equipment is being installed.

The South steel mill of the Lackawanna Iron & Steel Co., Scranton, Pa., resumed Jan. 3 after an idleness of several weeks.

The National Tube Works at McKeesport, Pa., closed on Friday night for repairs. Work will be resumed Jan. 10.

The Falls Rivet & Machine Co., of Cuyahoga Falls, O., was reorganized, Dec. 30, as the Falls Rivet & Machinery Co. The officers are: J. A. Long, president; E. S. Page (secretary of the Cleveland Rolling Mill Co.), vice president; Samuel Higgs, treasurer; H. J. Stambaugh, secretary. The directors are J. A. Long, Samuel Higgs, Theophilus King, vice-president of the National Bank of Redemption, Boston; George E. Clifford, president of the Wachucetts National Bank of Fitchburg, Mass.; E. S. Page, D. P. Wheeler and George G. Allen, of Akron. The members of the executive committee are E. S. Page, J. A. Long and George G. Allen. Messrs. Long and Higgs represent the old stockholders and the other members of the directory represent the creditors. The creditors are now in control of the company and will remain so until such a time as the indebtedness is liquidated. The mortgage bonds run for 15 years.

The iron molders employed by Jones & Laughlins, Ltd., Pittsburg, have received a 10 per cent advance.

The Pittsburg Locomotive works have an order for six locomotives for the Kan Sai Trading Co., of Japan. In 1897 these works shipped 25 locomotives to Japan.

The Youngstown (O.) Car Mfg. Co. is building 28 double hopper bottom gondola cars for the Pittsburg & Western, which are to be 35 feet long and 30 net tons capacity.

Guillotine shears under construction by the Lloyd Booth Co. for the Ohio Steel Co., of Youngstown, O., will weigh 175 tons complete. One casting, a housing, will weigh 26 tons and the crank shaft six to seven tons. The blade of the shears measures 114 inches, and will cut 12 billets of tin plate or sheet bars at one time. There have been constructed a series of friction tables fitted complete with automatic gauges which control the action of the shears.

SHIPMENTS of Connellsville coke in the last week of 1897 are referred to by the *Courier* as the largest for the year. In the week ending Dec. 25, the shipments were 7,868 cars; in the preceding week, 9,420 cars. The outputs in these two weeks were 154,105 tons and 154,200 tons respectively.

THE city of Cleveland will soon ask bids for its 1898 supply of cast iron pipe. The 1897 contract was for 6,000 tons at $19.70 delivered on the streets—a figure that represents a good margin for the local bidders, the Lake Shore Foundry. In view of the decline in the price of pipe in the year, it is to be expected that the new contract will be made at a figure somewhat below that of 1897.

Steam Yachts and Marine Machinery.

Also Towing Launches built by Marine Iron Works, Clybourn and Southport avenues, Chicago. Free illustrated catalogue. Write them for it.—*Adv.*